



SEQUENCE LISTING

RECEIVED

APR 03 2002

TECH CENTER 1600/2900

<110> Abe, Yuki
Ono, Chiho

Yoshikawa, Hiroji

<120> Genes from a Gene Cluster

<130> 01149/HG

<140> US 09/836,705

<141> 2001-04-17

<150> JP 2000-116591

<151> 2000-04-18

<150> JP 2000-117458

<151> 2000-04-19

<160> 62

<170> PatentIn version 3.0

<210> 1

<211> 34203

<212> DNA

<213> Penicillium citrinum

<400> 1

gatcaatact acgtcggttgt tatttccttg tcagtaatga ctaacaaatt ccccagaaca
60

gacgaagtca cagctcacac cacaagagaa aatgagtcca gcgaggatta cagatttctc
120

gccaggcaaa ccgagaaaaag ctctcttatg catccacggt gccgggtgct cagcagccat
180

attccgcgtc cagatctcta aactgcgcgt ggcgttgaaa aacgagtttg aattcgata
240

tgcgaccgcg ccgttttagct ccagccccgg acccggcgtg ctctctgtct tccaaggcat
300

gggtccatac tacacctggt tccaaaagca tcatgacgcc gttacaaaca cgacaacccc
360

cacggtgggc gatagagtag cggctgtgat cgggcctgtg caaaagaccg tccaagattg
420

gtctataact aaccacagc caccattgt cggcatagt gcttctctg agggcgcatt
480

ggtcgccact ttgctgctcc atcaacagca aatgggaaaa ctgccatggt ttccgaaaat
540

gagcattgct gttttgattt gctgtttcta tagcgatgaa gccagagatt acatgagagc
600

cgaggcgcaa gacgacgacg acaagctaataatcaacgtg ccgacactgc atcttcacgg
660

tcgtcaagat tttgctctcc aagggtcgag acagatggtt gaaacacatt acctgcctca
720

gaatgcagat gtactcgagt ttcagggaaa gcataatttt cccaacagac cgagtgatgt
780

ccaggagacg gtcaagcgct tccaacagct atatcaaaag gtcaagatgt caggttcatt
840

tgtctaggtg agacaacagg gtatatagca aggctctggc tctcatgcct agtccatacc
900

acatttttac tgaacaaatt tgaatagttc taatcttaca cggtttgaat gctcaccttc
960

caagggtgat ttagttatag tggtcgcgac catctcataa atatttcgtg aacatatttt

1020

ggatagatca tggaaggctc gttctgaaca ggcatgacag acatctaaaa ccactcgatc
1080

accacaacaa ggcactaaac cagtaactat ggaactatTT gcaatggcgt cgaatttata
1140

tacaggatgg attgaaatca attccaagcc ttggaggttt caccttcctc acagagtctt
1200

tcgaaacgcg ctaccgaggt atatttatca ccgttacggt actctgaacc gcgctatcta
1260

acttgatggt acgattgctg caataaagaa gagcaacgaa ggtagaagta attttgacaa
1320

agatacaaga cgaattcgct atttgtagat gaatatgcgt gtgtcaattg acgccgaatt
1380

caggatagat ttgccatctg ctctattgcc aatttctaatt ccatctttat catgaacaac
1440

actcaaacca cacatctgaa ttcacggcgc tgaacgatct aggccaactt cagagccggg
1500

ttcatcgaga acatagtgag gattgaagaa aagtgggtcta caaaggcctg agcgtgctca
1560

gggccataca gcgagctctg aagtttgaca tgaatgagtg ggtccttggt agggatcatcc
1620

cacatctcga gaacgatgtc ataaggagtg cgctcacggg aagcgagaac actcgtcatt
1680

ttggcattgc caattgagcc actctccgct tgaccctgct tgtaatcaaa gacagcctgg
1740

aacaaggggg cgtgtgtctg agtcttgggg tcctcgcttg aggtagggag attcaggcct
1800

agacagtcga ggatgacgcc atacggcacc cgcgcgtggt gcatggcctc acgcacactg
1860

tccttggtgg ctacaagggtg ctgcgccgaat gtcttgctgc cgacgaactc atcaaagcgc
1920

aggggaagca cgtagcgaa aaagcccatc gccgaaattt cttccatggt ggatcggttg
1980

gtttcggcga ggccgatggt tatgtctttg ctgccggtaa gacgcgccaa caaaacgtgg
2040

taggcggcca ggtagaactg catggggggt gccttgtgct tgcggctccg ctctttgatt
2100

cggaaggcga ccatgggatc taaacgagca attgcttcat actgctgcc a cgtgaatggc
2160

tgtatttgct gctgctctga attggcagca gggtcattga tcagattcat gatgggaagc
2220

acggttggcg cagatgacga gactttgcta tgcattggact tccagaacgc gatatcgctc
2280

ccattcgcc cattttccag gttttccgc tgttggaagg ctagatcaga gaattgggtc
2340

gatggtcgct gcattttcac cccgctgtaa atctgccga tctcattgaa caggttttct
2400

gttggtgagc catcaccaac taatctgtgg tagccgatta ccaacagggtg gtcattctgtg
2460

ccccagtaga aatcaacgag tctgagagtg tcacctgtgg agatgctata gtttgtcttc
2520

tcgagtttcc ggtactcttc ctctgcctcc gcagcgttgt tcacctgaac aaagtgcact
2580

ctgttctccg ggttcttgag aaccacttgg acgggaccat ttaaategct gctatagtca
2640

tcgccagtaa caaagcacgt acggaagatc tcgtgacggc gcaatgaggc tttcagagcc
2700

cgcctcaacc ggtcgaggtc aatggtaccc ttcattgaaca tgccaatagt gttggtgaag
2760

atggtatgat cttttacat ttgttgctgc ctccaggaat actcctggcc aagggacaac
2820

ctctcgcgac gaagaatctt acggcctccc tgctcattat cgtcctcttg ctcttcatcc
2880

tcttcggctg acgacgcac tgtgctggta gcagagcttg cttcatcatg gctgtctgtt
2940

ggtgtcggag aagccccgct gtccgagggt cccgtggaat caccaatttg caacagcagc
3000

ggaatggatg tagctgggag tcgggtggcc gcgtcgtcgg caagatcagc gacagaagca
3060

ccgccaagta ccctcaagag tgggaggtca aggtagagtt gctttgagaa ccatgagccg
3120

acagtcactg cacccaagga gtcgacacct tgatcaatga gaggaatggt tgggtccacg
3180

ctctccccgt ccgaaacttg gagggtaaca cggagtttct cagatagacc atctgcaact
3240

ttgttagttt gaactcgata tcaggaaacg catgagagat aacttaccaa tcacgatttg
3300

ccgaacttgg tctaaagttg ttgcttgttt gagctggtcg gcaatggagc ctttagaccc
3360

tgatccattg tcgccaccgt ctccgcgttg accgggaatt ttgaagtttc cgaaacgagg
3420

gtcgttgaag taaataattc gatcttgaag cgcagggcca agatctggga taccctgggt
3480

aagctcaagg tccgccatgt caatgaccgt cttgcgctgt ggttgctgcc gggcacgctg
3540

gtcagacacg accgcttcgg cgaaaagcgt gtgcagctca tgctcttcaa ctgagtcaaa
3600

catgaaacgg atagcatcaa agtcctcctc catctcggcc ctcgtagaaa accctacacc
3660

gtaaacggca ccaatatcga tggttgatcc ctgtgggtgt gcgttagtaa cttgacgtcg
3720

atgcatgata attcaggggt agaaaatacc gccaatcctc tggcgcaccg ttgctgggcc
3780

agagcctgta ggtaggcatt cgcagcgcca tagttggact ggccaggatt gccaataact
3840

gcaacaatgg acgaaaacat gatgaagaag tcgagcgctt tgctgcccgt ctgttcggag
3900

aaccgttcac gaagaatgcg tgctccttgt acctggggct tcaacaccat gtccatcatc
3960

tggtgggtcca tgttcttcag catgacatcc tgcagcacca aaggcccgaa cgcgatgccg
4020

gcaacagggtg gcaacttcat atcgacaagc ttgccaaaggc cagcatcgac tgaatcctca
4080

ttggcaacat ccctaaagaa agtaattgga taagtaaacg aggatgtggt agcaagggtg
4140

gatgtgatat caatcaactt acattgacag aacgggtgatg tcaccaccaa gtgcctccat
4200

gttggcgatc catttgggat caagtcgagg gttccggcta gtgagcacia catggcgggc
4260

gccatgcaag atcatccagc gacagagaga gcgaccaagg tccccggtaa gaccaacaag
4320

caaatacgtc ttcttggttg aaaataagtt accagagtcg atggggcaaa tcctagcgga
4380

cacctcattt tccttccagt cgatgacggg ggccagattg aagcgttggt cattgtggtt
4440

gacagagagc tgaccaggca agagaatttg tgtggctgta ataactttct cagtgtcgtc
4500

gacagtcgac gcagagacgg tattttttgc cattgccaca gagtgctcga ggattggaat
4560

atcctcaaca tgactaactt tgtatgtgga agctgtactt cggataagat agtcaccact
4620

gtacatgaag caactgggtg gtagcaactt ggccaaacgg ttggttatcc cggcagcagt
4680

ccggtcggta gacaagtcaa agaatgccat catgtttgtc ggcaggctgt gtttcagccg
4740

agcgtcgggt tccttggcat gtaatcggat ccaaggagcc ggaatagttt tgacgtcgga
4800

cagagttggt gccaaatgaa cctgaacacc gtaggttttg gccgactcca gaattgcttt
4860

gacgcagaag attgggggct ccataatcag aattgatgca tcagagccaa aggactgagc
4920

gctagagaga attgtttcgg caaggagggc tgcagctgtg gacaacaaga aggaactatc
4980

ctgccttcc gccatgttat cgggcagact atgcatgtag tttctcggta catgcagtat
5040

agatccattc ttctcagcca gggcgactac aggcacctca catgtattct ccagaatact
5100

gccctgcacg acatggaagt atccgagatg gcccacgcga attgcctggg gaagagcgta
5160

gcgaacacga acagttgctt ttccagcatg acgagcgtct tctaacgaat cacacgtctc
5220

ggttgactca agatagtaca tcgatgagga tgctcccctc gcctctttca gtgcaatggc
5280

cgtcttggac gaattaaagt taccgaaaat tggacgacga gacgagttca tacggtcggt
5340

cctagcaata tcctgcttca aacgagggac ccaggcacga cccttgcacc agtacacttc
5400

gggctcatga gtccatgtta ttgattccaa aagctgatca tcgctctcct cgaagcgcaa
5460

aagttgctca acgaagaatt tgggtgtctag gttctccaca gtatcgacat cgaagacgtg
5520

cgttcccaag tcagggttct cgagcttgat tgtcctcaac attccgatgg tgctggcctg
5580

gtggggatga tcaatccagg cattctctgt cagccacatc atgcgtccgg cgtagaagag
5640

aagagacttg actgcctcaa acttgtcctc ttcaagggtg caaaacactt catcatcaag
5700

ttccgagagg atgacaaaag tcgacttagg ctgcaaggcc gggtcgtcga gaacactttc
5760

cagccgcttg acggagtgga tgtgtctatg cggtagggca gctttcatgt cgttcaaaat
5820

gcgttcggtt tttgtcgatt cgccaccgat aaccactaat ggcgggtatg agtccttcaa
5880

tggagcagaa agtggatcat acaaacgctc aacggtggca tccacagcat gtgtactgaa
5940

gacagacggg atcaaatacat cctctcgatc aagtgtccga ctatcgacgc cagagaaccc
6000

aactctcttg agggtatgct cccattgggtc aacggacccc gaggcactca aagcacgagt
6060

ttcgtcttct ccagtcctc gatcagcgaa aagcccagag atgaaggcga ggcgagcagg
6120

ctcgcgatgg gtgaccccga aagtaaccaa gtgaccaccc ggcttgagca aggaccttat
6180

gtgagccaat ttttcctcga agttggagct ggcatggagg acatcggatg caataatcag
6240

atcgtaggag tgaggcttga atccttgctc tgctgggctt ctgttgatgt ctagtgctc
6300

aaactgcatg agaccgtcga attcggaaag ttgttcacgg gccttgccaa taacatccgc
6360

cgagatgtca gtgcaagtgt aactgttgaa accaagttga ggtgatgcaa gaacgcgctt
6420

cgtggcgatg cctgtaccca agcctaaaaa gcgaacgaca gattagcaaa ctgcctagtt
6480

acttacattt cagattcgac ttaccgatct caaggatatc aatggattgg tagcgatgag
6540

caatttggct aaccagatcc tgaacgacgt gtattgctga gccaaaggcg agcttgttgg
6600

tatagtactc ggtgaacaac ccatcgcggt tcatgatatc caaaggatcc ccgttcccgc
6660

gaacaattga aattaattct ttgcctaccc tttggatcag gcgcacatgt ggggtgggacg
6720

agttgcttca agtaaaagggt taatataaaa gaatgaaaaa acacggaaca gctttgggtg
6780

tacctttcac acatttgctc aatgtgaaca gaagtgtcct cctcccaaga ctctgggtac
6840

cactgatggg gccagcccg agcatcggcc tgaacctggt cacaccattc aatgtacttc
6900

tgggaatgga ggtcggcatt ttgacggctg tcgggggtta tctgggctag gaaggatttg
6960

atgtagaagt aaacgattcg ctcgatgggc agaatgtcct ccttgtcccg agctatgatc
7020

aacgtcgcag ggtcctccag cagtttttcg ggcgtgaggg gtccccagac ccactttgcg
7080

aagattcggg ggtcggtcga agcagtcggg ggagagaaag gcttaaagac aatggttatca
7140

acttgaaaaa gcgttggtctt ggtcgaatcg tacaccgtga tgtcgccgct caggaaatca
7200

cccttgtcgt gtgtgttgat tgtgtcaaac gcaagctcgg tttcaccaga attacccgcc
7260

gatatacaga gcgatggaat cagagtcact ctgtcaacgt gagtaggcac gtacaatgag
7320

cgtaggcgac gatctcctgg agaggaatac gctccaatga cagtctggaa cgcgatgtcc
7380

aggggcgctg ggtggagcaa gaggggctca ttgcgcaatt catccttaag tggaaggaaa
7440

gccaaagggtgc cgctagcttt ggagtcggcc cttctcatgg tctgcaaacg acggaagtct
7500

ttgctgtagt catacccaag gaggtcaagt tcccgataga agaaatcgat gttgacattg
7560

ttcatctggg ggtactcttc ctcaggtggc ggcaaaagct gcgatgacgg tgatgcctcg
7620

ccaagggtta tgacgatttg gcctttggcg gatgtcgaaa gctcactctc ctttgccaga
7680

caggaaatcaa taacaaattt gaccgtgact tggccatccg catcattgtc actggtgact
7740

tcggctgtca agttcagctc cacggagggtg ttttcatctt caaacacgat ggctttgttg
7800

atgctcatgt ccaagatttc caggagctga acttgggcgg cacgctcacc agccaccttc
7860

atggcagctt ccatggccat aattatgtac ccagcagcgg ggaacacagt ctggccttgt
7920

agcgcatgac cgtcgagcca ttccagatcc cggggcctga tgaagtttgt ccaactggaag
7980

gtcgatgctg tgctgtaaga agaaagcttt ccaagcagaa gatggggcgc acctccacga
8040

agatgctggc ggggtggagcg agattctgcc cagtattgac gagtatgatc ccaagagtat
8100

gtgggcaatg actttgacag gttttgaacg gcacgatcgg gccggacttg ttgtacgaag
8160

ccctcggcgt cgatactccg aactccgaaa cgctcccaaa tgtatcccag acctccagca
8220

aaagcgtcca catcgtcaac gtttcgtgcc aagcaccggt tatacggcag ctccacaccg
8280

gcaagagcat ccttgatggt ggctagacac ggacccttga gagcaggggtg ggcgccaatt
8340

tcgatggcga cgtcgattag acgatgagtg atgactgctt tctgcacagc ctgcgagAAC
8400

aagaccggag agacgagatt gtctttccaa taagcgggca tcacatcctg tacagtcatt
8460

tgcttgctgg tctcgtggac ggcagagaac caagcaaac tatcgttacc ttggccatcg
8520

gcaacagcac agtcgcactc cagcaatgcc ttgacatatg gagctgcgca tgggtgcatg
8580

tgatgcgaat ggtaggcctt gtcaactctc aagattctgg caaaagtgga ttcatcctcc
8640

aagacacctt caacgtgctg gatagcatcc atgtcgccgg agaaggtcac actatccggt
8700

gaattgctag cggcgacgca gacccgaccc tcaaaggctt cgagctcgca tagttccttt
8760

gcgtcatcgt acgacatacc tgccgctagc atagcgcttg tctggccgct tggagaagag
8820

gcatgctccg cggacacaac tccacgcaga tgcgcaatac ggatagcttg agtggcactg
8880

atgaatcctg ccgcaaaggc acaggcaatc tcacctgaac tgtggccgac aattgcactg
8940

aactcgatac cagctgcagc gagaagtcgg accagaacga tttgtacggc gcagcataga
9000

ggctgggaga agctggcgag tctgacgttt gaggcattcc cttcaagcat gagctggtea
9060

tacagtgtcc acgtaggccg atacttttca ggcagtgttt gcagtgaatt atccagctct
9120

tcgagaatgc ctctcacaaa tggcataccc accatgagct tcttcagcat gcccggccac
9180

tgtgcacctt ggccagtaaa gacacctagt acgcgagggt tgtcattcgc gtcggtgcgg
9240

aagtcggtga cgacctcacc gtccgcgatg gcagcctcca gtgccgcgcg ggctacttcc
9300

ttgtttgtgtg ctgcaatcgc acgacggaag ggcaagatag accgtttctc aagtaaggta
9360

tatgcgatat catgcatgtc cacgtcatca tgcgtttcca gaaattggag catattttct
9420

agcgttgcc tcatggagcg ctgcgacttc gatgaaagca caaggggcaa gctgcatgca
9480

tctgcatctg aggtcacctc tgttaccact gctgtcggct tgtgtggagg agccatatac
9540

tcttcgataa tagcatgggc atttgtacca ccaaactctg atgtgtttat atgttttagct
9600

aacttcactt tcgtttctcaa gaagtgcagt tgaatcctta ccaaatgaat taacgctgac
9660

tctgcgaggc tgcccgggcg caacaatcgg ccattctgtg gcctccgttg caattttcaa
9720

gtgcgtatag aacggagcga cacggggact gatctttctca aacagcaggt ttggcgggat
9780

cacgccattt cgtacagcaa acgatgcctt cattaagccc gcaataccag cagtgccttc
9840

cgtgtgaccg agaactgtct tgatgctgcc gacaaaaagc tcattctttct cgccgtcgct
9900

gtcgattgtt ccatccttgt gtccgaagaa ggctgttgca atagcctcag ctccctgtgg
9960

gtcaccggct ggtgtaccag ttccctgggat cttcgtgtta gggagagaga gactttctgc
10020

aacttcata aggctgatac ttccaggga taccacttac catgggcttc aaagaactgg
10080

cagcgttcct ggggggttgg aatatcaaga ccagccttgg catatgtggc ccgaatgagg
10140

gcttcttgtg cgctatggtt tggcattgtg atacctgtcg ttcggccatc ttggttgata
10200

ccggtctctc ggataacaca ctcgatactg tccccgtcgc gcagtgcctg gctcagcggt
10260

ttcaggacaa tagagcaaac accttcctaa aaagcagtta caggagggtca gtgccatctt
10320

gctttttttg aaaggaattg atgcattgtc aacttactcc tctggcatat ccatcggcag
10380

cagcatccca cattcgagat ctaccattgg gggacagcat gttcaatttg ctctccatta
10440

caaaggtcat ggggcccaat atcagattcg caccggctgc aaccgccatg gtactctcgc
10500

ccgttctaag ctgttggacg gccagatgca cggcagctaa ggatgaacta caggctgtgt
10560

cgatcgatcat ctgcagaatc agtcaggaat ctgtcagcac ttgacgaagt cgggctcgct
10620

caatgagtgg cactcacact cggcccatgc cagtcgaaga agtatgatac acggttggag
10680

gccacactga cagctacccc cgtggcagag tatgtaggaa tactatccaa ttcacgcgtc
10740

acgatagtct catagtcatg cgtcatcata ccgacgtaca cagcagtaga ggatccttga
10800

aggccttgga tccgtaggcc tgcgttggat acagcttcat agaccgtctc cagcagcagc
10860

ctttgctgtg ggtcaatcgt ttcggcctct ccagcttgga tggtgaagaa agaggcatca
10920

aaaccgcgta gatcctcctg cagcaagtat gcaaaggggtg cgttcgtgcg cccgggggtga
10980

gtgccatcgg ggctgtaaaa tgtatcgacg tcaaattctt ccttagggat cttggtctgt
11040

acatcccggg gctctttgag cagctcccaa agttttgatg gtgtgttgac accacctgga
11100

aaccgacaac cgcttcccac taccacaatt ggctcgtttg gatagttggc ttgatccata
11160

actgctgata ctgttttttg gcgatatgat tgggattaaa ccttgtcttg cgtcagtaga
11220

tcttctcaact gcatgccggg cacaacattt gttcttacag aatcgcagag ttgaatctct
11280

gagcgaacaa gccggccttg caaccgatac cgtcgttata tttacttgca cgtatcagta
11340

ctcatctaga ttcggacaat ttcaagatcc attctagtag tcaaagtccc ccacttccca
11400

gcaatgcaag ctccggcacct agcaaaccct cccggcgta ttcgggtgcac gaatagccat
11460

tcctccatac ggcgtttattc ggtcacacga ggctgaatga atcaaactg aatatcaatt
11520

ggctgtatca aggtgaaacc gagtttttca ctccgattgt tcttgtgctg ctccggtgaag
11580

ctgctcctaa aggaacaac cgaactgccc catccaggta aacttcgatt gggggggggg
11640

tttttttttt ttcaagggtg actggaagag tgctctcggc caaaaatcc cagaagcatt
11700

agtgtgtta ttcgattata aaccgtcgca gcgtctcat tcttcgctct ttcttctttt
11760

ccactgggtg gcataggtcc tatctgtctc acgcaatgct cggccagggt cttctgaccg
11820

tcgaatcgta ccaatgggta tcgaccctc aagcccttgt ggcggtcgca gtgcttctta
11880

gtctcatcgc ctaccgtttg cgggggccc agtccgaact gcaagtctat aatccccaaa
11940

aatggtggga gttgacgacc atgagggcta ggcaggactt cgatacgtat ggtccgagct
12000

ggatcgaagc ttggttctcg aaaaacgaca agcccctgag cttcattggt gattccggct
12060

attgcacat cctcccatcg tccatggccg acgagtttcg gaaaatcaaa gatatgtgca
12120

tgtacaagtt tttggcggat gtatgacct tgaattttcc attgttgtaa ctcaatgacg
12180

tctctaagat tctgatgaat gtataggact ttcactctca tctccctgga ttcgacgggt
12240

tcaaggaaat ctgccaggat gcacatcttg tcaacaaagt tgttttgaac cagttacaaa
12300

cccaagcccc caagtacaca aagccattgg ctaccttggc cgacgctact attgccaagt
12360

tgttcggtaa aagcgagggt aagtgtcaat ttttctgtct tgagcattga gcctctggct
12420

gacataccgc gaatatacta gagtggcaaa ccgcacctgt ctattccaat ggattggacc
12480

ttgtcacacg aacagtcaca ctcattatgg tcggcgacaa aatctgccac aatgaggagt
12540

ggctggatat tgcaaagaac catgccgtga gtgtggcgggt acaagctcgc caacttcgcg
12600

tatggcccat gctactgcga ccgctcgctc actggtttca accgcaagga cgcaaattgc
12660

gtgaccaagt gcgccgcgca cgaaagatca ttgatcctga gattcagcga cgacgtgctg
12720

aaaaggccgc atgtgtagcg aagggcgtgc agccgcccc a gtacgtcgat accatgcaat
12780

ggtttgaaga caccgccgac ggccgctgggt acgatgtggc gggtgctcag ctcgctatgg
12840

atttcgccgg catctacgcc tcgacggatc ttttcgtcgg tgcccttggtg gacattgcca
12900

ggcaccaga ccttattcag cctctccgcc aagagatccg cactgtaatc ggagaagggg
12960

gctggacgcc tgcctctctg ttcaagctga agctcctcga cagctgcatg aaagagacgc
13020

agcgaatcaa gccggtcgag tgcgccacta tgcgcagtac cgctctcaga gacatcactc
13080

tatccaatgg cctcttcatt cccaagggcg agttggccgc tgtggctgca gaccgcatga
13140

acaaccctga tgtgtgggaa aaccccgaaa attatgatcc ctaccgattt atgcgcatgc
13200

gcgaggatcc agacaaggcc ttcaccgctc aattggagaa taccaacggt gatcacatcg
13260

gcttcggctg gaacccacgc gcttgtcccg ggcggttctt cgectcgaag gaaatcaaga
13320

ttctcctcgc tcatatactg attcagtatg atgtgaagcc tgtaccagga gacgatgaca
13380

aatactaccg tcacgctttt agcgttcgta tgcattccaac cacaagctc atggtacgcc
13440

ggcgcaacga ggacatcccg ctccctcatg accggtgcta agatataaca cgcaaactaa
13500

aacaaatatg catccgtccc caggcttatt ccaatagttt ccgtcccaga gaaactaggt
13560

gctgtattag tcgagtaggt tagtaaaata aaacgcattt tattcgattg tgatgccttc
13620

tttgtaatcg aacgtggtgt agactttggc tatgtgcgag agacagaaac acagagagag
13680

agaagggaga gagtgtgtat tcttgctacg cagagcggcc atctgcttct ataccgccag
13740

ctacaccgcc acgtagggaa gtcggcagta atgaagcttt tctcccggtg caatcaccga
13800

tctccccatt ctctcaggcg ttgactggcg cttacgatga cgagggctta ggctctgtta
13860

agtcttgatg ttctactca acatccccga ctaggcgaaa gagaggacgg cgcaacgacg
13920

tggacacaag tactccctcc cgcttccga ctacatatcc acaatctgta cccactgccc
13980

gtgccaacgc ctttcgaccg ttcaacgcgc atttacaagg cttgcgggaa tcataatgga
14040

gagaaaaaga gagaactttt gacagtcaag cctccgaggt gctaagacag cttccctggt
14100

agtataaaaa gcattcactc ttccgacttc gagaacgagt gcacatgtgt actttgttgc
14160

ttctcagggc cactgtaatg gtatttcagg tatctctatt tactgctatc cagaagtcag
14220

gcattaaata gtcaggctca gcccaggctc gattcagatt ggattcaggc ttcagaccat
14280

ggccgctatg ctccttcgta ctatacctcc gtcgagctat acccgcttgg ccagacaaaa
14340

ggcttctactg aacccttcaa cttaactgca tttcgccaca actaactcga cgaggccggc
14400

gatggtgtta ccattcatga gctcaaagat cgacacatca acatggattt cagatgtgat
14460

ccagtttcga agttcaatgg cgacgagtga gtctacgccg acacctgcca ggtttttggg
14520

cgaggacatg tcgtcttctg ccagaccaaa cattcgcatc agcttttccg tcattgcttt
14580

gaggacgata gaaatggcct cgtcgtgaga ggtgaccctg cttagttggg cccgcacgcc
14640

atctggtcct tttttatgcg aagagacaaa ggattggtct gcatgaagga cttggcggtg
14700

tttaagtccc acaaaccgct gttcctgtat ccagtttgcc tcggtccagt gagcaccggg
14760

ggatgtgttg attcctgtaa ccacagctgc gggagggtgat ggaaattgag gggaagaaca
14820

caggattgcc ttctccaaca catccatgac gtccttttca tgcataaggct tgtaacctat
14880

tctagcgagc cggtcggcca caccacggcc agtttcagcc acgtatccaa cagacttgac
14940

catgcccaag tcaatgggtga cagccggcat gccatgggct ctccggtggt gcgcaagtgc
15000

gtcctggaat gcaccagcag ctgctgaatt ggcttggcct gccccacca tgaccccaac
15060

aagggatgag agcatcacga agaagtcaac atcctgtgcg atcttgtgaa gataccaact
15120

accctgtact tttgggcgtg ttgctgcatt aaattcatcc aatgtcattc gcgatagaag
15180

cgcttccttg agaaccatgg caccttgat gataacctga attggcgggtg catgtgcttc
15240

ttcgcacaa cggagcacct tggtgacctg atcttgatct gagatgtcac atgcgtgtag
15300

atagacagcg cactgttgat tttgcaagct ggttatgaat ggactggcct ttgcacttct
15360

cgataggata atcaagtgct tcgcgccatg atcaacaagc cactgacaga tctgctttcc
15420

aattcccccc agcccaccag caactaggta agaactgtca ggcttcagct tcagcgagaa
15480

ccctccatcg ccgactggga ccagttcgtc cccagataca ttgaccacaa ctttgccaac
15540

atgctgacca ctctgcatcg tacggaaggc cttctcgatg tttgacaagg agtgctgctg
15600

gattggacca atcaagccaa tcgcttttgt ctcgaggagt tttgtgacat ggttcaacgc
15660

ttcggatact tcttcacttt tggctctttg ccacgagaga agatcaattg atgtgaaaga
15720

gacgtcccgg gtgaatggca gcatgtcaag tctgctgttt tgctccaggt ccttttttcc
15780

aatctcaaca aatctgccga attcggccat gcagtcaaag cttgcttgga ggagttgacc
15840

tgccaatgag tttagaacga catgaacgcc aagtccgccc gtgtaggctt tgatgccgtc
15900

gacgaataag tcattcctgc tcgagaagat atgatccgga ttgatgccga atttatcgcc
15960

gacaaagtca cgcttggtt gagttcccgc tgtgacgaag acctcggcac ccgcaagctg
16020

ggacaaaatg atcgctgctt gaccgacgcc tccagctcca ctgtggatca agactctttc
16080

gcctcgctgt agctttgccg tggataaaag cgcaatatat gcggtagtga aagccagggg
16140

gaccgaagcg gcttctggga agcccatttc gtccggaata cggacgacat tagtgtagcg
16200

cgctctgtgt ctggtcgccc aatggccttt cagtagtgca catacgcggt ccctaattct
16260

gaggccttgg ctagcggcag cagctccacc gagctttgtg atcactccgg cgcattcgaa
16320

gcccatacaca cggttggcct ccaattgacc catggcaacc atgacatccc gaaaattgag
16380

accgaaagct ttgggttcga tttctaccca atcatccgga agatccttgc cttcacgtcc
16440

ttcgtcgtct cgaaattgca gggagtctaa gagccctggc gtctcaacct ccatccgcag
16500

acgacgcccg ggttgctcga acggctgcag tgtgacctca accgcttctt ggtccttcca
16560

gtgcgggtca ttgaaaagtc gcggtacgtg gatgacgccg tttctctctg caaattcaaa
16620

ctccttgtct tcggaaaggc cgccgaggcg gccattgaag atattgcaga tagcatacag
16680

ggactcgtgg gtgtatgcgt ttcgagaagg atcgagatcc aacgatacat attccttccc
16740

gttattttcg ttgcggatgg tacgcagcag accaatatgt agagctttcc atggatcctc
16800

ggagctcatg gctgctcctc tagacaccca gagaagtgcg ttgcagttat tcagcatcgc
16860

ggtgatggat ttgaaggctc cgcttcccac ctctccaagg agcgaggact ccatttcccc
16920

aagaaaaatg catgtccttc cagtggatc tacctcgccc agagcgttga tcgatgggct
16980

agaactggtc ttttcacaaa ttgctgcctg gagactttcc agccaagatg aaggaggctc
17040

gagcgctccg tgcagcaaaa gcacctccga ttctgccact gtatccgggg ttgtattctc
17100

ttttctagcc gtcgatagca ttgtgctgat catgtaaaac tcatcgtctt cacaatcacg
17160

aacctccaat tccacaccgt tgaaaccgct cgtgtccaac atgggtgttcc aaagatcggc
17220

agtgagcgat ggcgtcgact tccgctcagg ctctcactg agccaccaac ctggcaacag
17280

tccgaaggta aagaacaaat cgagctgac cctggtagtc tcaacaaaa tcaagtgc
17340

cccaggcttg agcaattttc gaacgttact cagtgttcgt ttcattgac gagttgcatg
17400

caggacctgg caagccacga ccacatcgta ggtggcacat tcaaaccctt gttgctcggg
17460

atcgctttca atatccaatt ttttgaaagt catcacgtct tgccaatccg caaattgctc
17520

acgcgccgac tcgaaaaacc cggcagacac atcgggtgaag tcataacgat cgatcggctt
17580

ggtgtttccc aatgcattga caataagctt tgtgcagccg cccgtgcctc cgccaatctc
17640

caaaatgcga gaacgcgggt tcttggtggc gcaaagtcgg atcagctgc tggcttgctg
17700

gtttgatcgg ctccatttga ttgcgttgac gtagtatctg cttagcagct gatcttgcat
17760

catcaactca agtggctctg tttcgcgcg tagcattgct attaactgag gtcctagacg
17820

agaaatcatc tcgccattga cgctttctcc agcgactctg gcctgtaggc atttcttctg
17880

ctcagcatcg tcaattagcc agtcgcaact ggctgggctg agcttgtttt gtctcgcaag
17940

gtccaattgg acattcatcc aatcgaaata cttctgaagg tggccatcca gatgttgat
18000

atcagaattt gtcaaactcag tgacagcctc ctgtataaag ttgatcgtgc atcttcggag
18060

gtccatcatg agttccgttt ctttcgtctc agcctcagtg ctcaactttt ctttgagcca
18120

agtggagtca cccaagctga tgtcaggggc ccaaaccag gagctgcagg cattttctgt
18180

gtcgttgag tctgactttt ggtcagagaa gctgcttcca accgactgga aaacaaggcc
18240

ttcaatctct atgactggga ttccgtccga gggagaagaa ccgctatcat agtcatcaaa
18300

1
cactgccaaag tcggtagaga aggattgaga gttgcgatcc ttgatgctgg cctgtgcgtc
18360

cagagcatca ccagcctcca agtcagccag gctagaggat attttgacat ttottagcct
18420

ccttgggtacc atggccgttt tcatacgtgt tcccgcgtag ggtaacaccg tgtatgccgc
18480

ctggatcacc gagtccagag tagtaggatg gacgatgtgt cgattctcgt acgagtgagg
18540

catagccgag gcagtgtcag caatggaaaa tctgcaaaac gagccctgtc cattgttttg
18600

aattcgctga atgttctgaa aaatgggtcc gtggcatatc ccattcgcgt gtaaggactc
18660

ccagagatcg ttgggatcaa tgctccggtt atctgagcct agattcaacc tgcgtgaggc
18720

ttccacagtt gaacagtcaa ggtggcttct ttcgctctcc gaacgtatta atccggtgca
18780

gtgttctgtc caggtattat tttcgcccga aattgagtgc acagaaaatt gatgccagtt
18840

ctttgtgccg agggaccttt cctcacatga acggatcggt aggcgcaggt caacctctgc
18900

ttctgcatca gcgggtatta tgagagcctg cgcgagttca acgtcacgca agttgtagtt
18960

gatgctagcc cccgcaactg gtgggcagac ttgtgaaaac ccctcgatgg ccatgctgat
19020

gaagccagct cccggaaaga tgatgctcga accaacgacg tgatctcgta tccatggaat
19080

atctgacaga cggagaacat gtttccattt aggcgcgaaa tgaggagaga gagattcccg
19140

tgagcctatc aaagtgtgag gcggatgggt tctctgtttg gactcacgac tgccgcgagg
19200

ctctctccaa taacgggttt ggtgattcca cgggtacgcc ggcaaatcgc tcagtacctt
19260

cactctgggc tcttttcttc catgaggaaa gtttatagcg tccattttga gcccataacc
19320

cttgcttatac aactccgtag cagcacgata cattgtctcc aacgagcttc tgccgcgaga
19380

aaggcaactg agatagttta tatctgttcc tttcagaccc agatcctgca tgacttggtt
19440

gattggacca ccaagcgctc cgtgaggccc tatttcaata atcacatcga cggctttctc
19500

tttgggtgtg ggatcaaagc acatctcgcg gagtgaggac tcgaactcta ccggctgtag
19560

catactatcc atccagtgtg tgggatccaa tagcaattta agatcgggtca tgcgactacc
19620

agtcttaggt gatgaatata atacaccctt tgagggtgtca gcattgggat tgtcgttggt
19680

gttatccgag ttgaacagat ctctcagtga cgcgccaaag gcactcgcca ttggctcgcat
19740

gtggcttgaa tggaaggctt cagtgacttt cagtttcctg gtaaagatgc catcggcgtg
19800

taacaacttt tcaagtttct cgattgcacc caaatctccc gacaccgtca cactacattg
19860

actgttgata catccaacca ccacacagcc gtcctcctgg ttgagacgcg aaatgtaaac
19920

attggtctca ctgcgaccaa gaccaccgc catcattcct cctttggctg ccaatgcggg
19980

cttgggctta gtgggtcaata caccgcgtat ataagtgatc ccaatggccg accgcgcgga
20040

taaagcccca gctgcgtagg cagcagcagc ctctccactt gagtgactgg ttatccccgt
20100

tggccgaatt ccccatgacc aaaggagacg cacaagtgca atttggatag cggttgacag
20160

tggtagactg tattcggcat catttaccog agtcgtcagc tcatcacggt ggagctcctc
20220

tgtgcaattg aatgttagta cctcaagctt gatacagtat tacttttccc gggctcgcaa
20280

cttaccata aaattccaac tcgcgcccag ttgcttgatg tagccatcac attcaagaat
20340

cgctgtttg aatactggga atgtattgac cagctctctg cccattgcat gccactgcgc
20400

cccctgaccg gtgaatacaa atccgagccg tacttttctca ttcgctcggt ttggttgatt
20460

ggactcatcg ctgagggcag aaacaaggcc gccaaaggctg tctgctacat aactgacgt
20520

ccatggcaga atggaacggc gagagcctag tgtataggcg aggctggcga ggaagggttc
20580

cccgatcaatg tcagcgacgg atttaatgta gtctcgcagg cttgctatcg ttcgccgaca
20640

agcttgctcg tccttggcac gcacaacgta tatgcggctc tgtttggaac catcctcaac
20700

cctaccatgc tcagagttac cattgacatg cacttgatcc tctggcaggg ccaatgatgc
20760

gcatcatat gattccaaaa tgacgtgagc attcgaacca ccaaagccga agttattgac
20820

agatgcgcga cgagtcccat ctttcacagg ccagtcttga gcagacatgg ggcctttga
20880

aacattaacc tttgaaacat ataactgaat ctgcgaatgc gcaaagcctt accttgatgt
20940

tcttttggtc aagcatcagc ttgctgttct tttgcaggaa ccgcgcatta gggggaatca
21000

agcccttctc caaggccaag gccaccttga ttatactggc caggccactg gcggcttctg
21060

tatggccaat atttgcttcc acagagccaa ggtgcagagg atgtccttta aaagctgctg
21120

aaattgctga gatttcaagg gggtcaccag ttggtgttcc agttccgtgg gcctccacgt
21180

acgaggtcaa cgacatatct agcccagcct tatcgtaaca ctctggatc agacttttct
21240

gcgccacatc actcggcgca gtaattgcgg gtgttttgcc atcctgggtc agcgtgtct
21300

ctcgaatgac ggctcggata gggctcttggc ctcgcaacgc gttagggagg gcctttatta
21360

ccagagcggc aattccttcc ccgcgaccat atccattcgc tcgaggatca aaagagtacg
21420

agataccatc cggggacaaa aatctgtcat tgagcaacaa ggattgctta gttcaagact
21480

ctcgatctgg aatcttcttc ggaaaactca cccaggttt gacatcgtaa caaaaacatc
21540

gggattgagc agaagatttg caccgataac gatggctgta tctgactccc cagtacgtaa
21600

gctctggcac gccaaagtgc gtgcggtcaa tgtcgtcgaa caggccgtgt caaccgtcac
21660

gctgggacca cgtaagtcgt agaagtgtga tatccggttc gaaagcattg ttcttgagtt
21720

gccagttatg aaataacgcg gaactgtctc ggggtcacga ttgagcgaat cctgatagtc
21780

gtggtacatg acacccccaa acaccgacgt attagagcct gccataccat cgatggatgat
21840

accggctgga tgatggtcag tgacgtttgc ttacagtgcg gatgaccac actacatacc
21900

actctccagc gattcgtaga ccacctcaag cataagccga tactgcggat ccatgcactg
21960

tccaatatta gatctctgcg tcccgggtta gatcaattga aataatcata cgctggcgac
22020

ctctgtggtc atgttgaaga acgcggcgtc aaataaagca ggatcctcgt cgatgaagtg
22080

tccacccttt acgtgggtct atccagtcac ccttggagtc agtaaccaag cttcagtgat
22140

gctcaaactc tgtgtcaaat attcaaaaca agatataaat gcatgcatgt tagatactca
22200

cggacccgac cctttcgcca ttccgggtgg atactcctct cacattgaat cgcgaggagg
22260

ggaccttaga ccaggcactg cctcctcttt caaccatttc ccaaagcttc tgtggactcg
22320

ttgcatctcc agcaaatcga catcccatte caactatggc aatgggcgtg gatgtgttag
22380

agcaagccga gcctgccatt gcggttgcgg ttgcggttgc ggttgcggtt gcggttacgg
22440

cgggggtatt gttcattcca acgttgtttc attgactgat atatcagtcg ccctggtgat
22500

aaaaccgttg atagtcttcc aacagtctac aggtccctgg catagctata gatgcataag
22560

ctgcccccgga cacgtgattc atagttcggg gtttgttttc atcttggacg tgacacgata
22620

ttcgctctgt gcccatggga aaccccggac caccatgcta tgctcggggc aataccttag
22680

aggtaccggt tcgggaggca ttgtctgtcg tcacgataat cccgagtcaa aacgccgatg
22740

ggaaaccgtc gaacaagacg aaacagggtca ggccggccag gtagtttttcg ggtataatgg
22800

aggctgtcag aatccgatac tccgtacaca gatgcgaaat acgcatacga gctatcaaac
22860

caaacgaatc caaaagcctt ggaaaagctt ggaaaggctt agtgggtaat cctgtcccaa
22920

ggtttgttga gggcctgagc gcaggggtggg tcctgtaagc agttggtaat tcaatttcca
22980

acaatacaca atccccaaaa tttgcattat cggttgacta agacaagcaa acaaaatata
23040

tgcaggaagc gcaattcatc gcgagcaaac gatcatcatg agcatgtgac cctttcctct
23100

tttttctact tcggaaggcg gcatgatcat ctgtcagaac tcccaatcgg gagcaatacc
23160

ataccttacg gcacccact cagacccatg cacaaagaaa atccatgcgc cgaatattga
23220

agccttggca acaaagcccc gtgtaactcc gaaggatatcc aaagaccgag agacgccgat
23280

ttgagagaca cgtacggagg tccacacaaa atgttcccga gtctatacac tatactccaa
23340

actgacttct tgtctacctg ggtatcttgt tcagggttgct gtttactgag ataaatgata
23400

ccggggggggg gggggggggg ggggggttgac actggcctttt cgtggacaga ataataccca
23460

tacatccctg cgtaagtagt cgtttcgaga agaatgtgtt tcgtggtgca ttactccgta
23520

ggcacaatat atttccattc ctcacgaagt ggcctcgtcc gggcgtgatc gatgcagctt
23580

gccgccccac caaaaaagga ccacaatacg agtcagatta gaaacgtcta acaggacgtc
23640

tatgtaagag gacgctcctt tgtatgtcgg atctaggcat gacaaaataa ctatacctag
23700

gtagtgttct gtcttattgg tcatttggcc tactttcgga acaatcttgg aagttcacat
23760

tcctaggtat cagggcaatt gattggtgtc ccagaattc ttttttctcg aataaaggat
23820

aaatttatgc ataaaaacct tggaaactga gcatagttat gagcacaat actagttttc
23880

agtgaattg gtcctactat cctttgcttg gtaccctta ccaattatac cctaggcagc
23940

agttgacacc ggtcatgaat ccattcataa aggtggacca gatgcaggga taaggaagcg
24000

aatctttccg ctgcctcagc ctcaggggcg cgcgccattt gttattttct tctactcatt
24060

tcccgtacct aggaactggt cagttgtccc tcccaacccc ttgggccgaa caaccttctt
24120

ccaatctacg acggcagatt atacctaggc gcctaaccga ttaggttgct cattcgattt
24180

tggaggtatg cactttatct caagccctaa ttcccaattg aagtgccttt ccgtcccat
24240

ttgcagagct gactagattc ttttctcaga gactacctag ctataggtag cactccaagc
24300

tgtagcacag acctttcagc atggtcgctt cgttgctacc ctctcgcttt cgcggtaggg
24360

aatcaatgaa tcagcagcac cctctacgct cgggaaatcg ggcattgacc tccacactcc
24420

aattttctatc caaaacggcg tgtctacacc cgateccatac cgtttgcacc atagctattc
24480

tagctagtagc cacatacggtt ggactactca aagacagctt cttccatggc cccgcaaacg
24540

ttgataaagc agaatggggc tctttgggtcg aaggaagtcg aagcttgatc accggcccac
24600

agaatggctg gaagtggcag agcttcgacg gggatgcaga tgttctcgga gatttcaacc
24660

atcaagcact aatgaccttg gtattcccgg ggtcatatgg ggttgcatct caagcagcct
24720

caccattcct tgctcccctc cctgtgaacc tatctgtgat tgaccttccc tcaacgtcga
24780

gccctttaac cgcctattcg aaagataaag ttttcgcctt ctctgtggaa tacagcagcg
24840

cgccggaact cgtggctgct gttcaagaaa tccccaacaa cagtgccgac ctgaaattgc
24900

aggagacgca attgatcgag atggaacgcc agatgtggat catgaaggct gccagggctc
24960

acacaaaacg cagccttgct caatgggtgc acgatacctg gacagagtct cttgatctta
25020

tcaagagcgc tcaaacgctc gacgtgggttgc tcatgggtgct aggttatata tcaatgcact
25080

tgactttcgt ctcaactcttc ctacagcatga aaaaattggg atcgaagggt tggctggcta
25140

caagcgtcct tttgtcgtca acatttgcct ttctcctcgg tctcgacgtg gccataagac
25200

taggggttcc gatgagcatg aggttgctat ccgaaggcct ccccttcttg gtggatgatc
25260

ttggctttga gaagagcatc actctgacca gggctgtttt gtcctatgct gtgcagcacc
25320

gaaagcccca gaagatacag tctgaccagg gtagcgtgac agccattgct gaaagtacca
25380

tcaattacgc cgtacgaagc gccattcggg agaagggtta caatatcgtg tgccactacg
25440

tggtcgagat cctgctccta gttatcggtg ctgtcttagg catccaaggt gggctacagc
25500

acttctgtgt tctagctgca ttgatcctgt tctttgactg tctgctgctg tttacattct
25560

acactgcgat tctgtctatc aagctcgagg taaaccgcct caaacgtcat atcaacatgc
25620

ggtacgcgtt ggaagatgag ggtctcagtc agcggacggc ggagagtgtc gcgaccagca
25680

atgatgccca agacagtgca cgtacatatc tgtttggtgcaa tgatatgaaa ggcagcagtg
25740

ttccgaagtt caaattctgg atggtcgttg gtttccttat cgtcaacctc gtcaacatcg
25800

gctccaccct tttccaagcc tcttctagtg gatcgttgtc cagtatatca tcttgaccg
25860

aaagtctgag cggatcggcc attaaacccc cgcttgagcc cttcaaggta gctggaagtg
25920

gactagatga actacttttc caggcaagag ggcgcggtca atcgactatg gtcactgtcc
25980

tcgcccccat caagtacgaa ctagagtatc cttccattca ccgtgggtacc tcgcagctac
26040

acgagtatgg agttggtgga aaaatggtcg gtagcctgct caccagcctg gaagatcccg
26100

tcctctccaa atgggtggtt gtggcacttg ccctaagtgt cgctctgaac agctatctgt
26160

tcaaggccgc cagactggga atcaaagatc ctaatctccc gagtcacca gttgatccag
26220

ttgagcttga ccaggccgaa agcttcaacg ctgcccagaa ccagaccct cagattcaat
26280

caagtctcca agctcctcag accagagtgt tcactcctac caccaccgac agtgacagtg
26340

atgcctcatt agtcttaatt aaagcatctc taaaggtcac taagcgagca gaaggaaaga
26400

cagccactag tgaacttccc gtgtctcgca cacaaatcga actggacaat ttgctgaagc
26460

agaacacaat cagcgagttg aacgatgagg atgtcgttgc cttgtctttg cggggaaagg
26520

ttcccgggta tgccctagag aagagtctca aagactgcac tcgtgccgtc aaggttcgcc
26580

gctctatcat ttcgaggaca ccggctaccg cagagcttac aagtatgctg gagcactcga
26640

agctgccgta cgaaaactac gcctgggaac gcgtgctcgg tgcattgttg gagaacgtta
26700

ttggctatat gccagtcctt gttggcgctg ccggtcctat tggtatcgac ggcaagagtt
26760

atttcattcc tatggcaacc accgagggcg tcctcgtcgc tagtgctagc cgtggcagta
26820

aggcaatcaa cctcgggtggc ggtgccgtga cagtcctgac tggcgacggt atgacacgag
26880

gcccggtgtg gaagtttgat gtccttgaac gagctggtgc tgctaagatc tggctcgatt
26940

cggacgtcgg ccagaccgta atgaaagaag cttcaattc aaccagcaga tttgcgcgct
27000

tacaaagtat gcggacaact atcgccggta ctcaattata tattcgattt aagactacta
27060

ctggcgacgc tatgggaatg aatatgattt ctaagggcgt ggagcatgca ctgaatgtta
27120

tggcgacaga ggcagggttc agcgatatga atattattac cctatcagga aattactgta
27180

cggataagaa accttcagct ttgaattgga tcgatggacg gggcaagggc attgtggccg
27240

aagccatcat accggcgaac gttgtcaggg atgtcttaaa gagcgatgtg gatagcatgg
27300

ttcagctcaa catatcgaaa aatctgattg ggtccgctat ggctggctca gttggcggct
27360

tcaacgcca agctgccaat cttgcggcag ccattttcat tgccacaggt caggatccgg
27420

cgcaagttgt ggagagcgct aactgcatca ctctcatgaa caagtaagtt gaaagcggcc
27480

gcttacttgg aaacattcac taatcctgtt tagtcttcgc ggatcgcttc aaatctctgt
27540

ctccatgccg tctattgagg ttggaacgtt gggcggtggt acgattcttg agccccaggg
27600

cgcaatgctt gacatgcttg gtgtccgcgg atcacacccg accactcccg gtgagaatgc
27660

acgtcaactt ggcgcgatca tcggaagcgc tgtttttggt ggggagctct cgctatgtgc
27720

tgccctagcc gccggtcacc tgggtcaaggc gcacatggcg cacaaccgtt ctgccccggc
27780

atcttcagcc ccttctcgaa gtgtctcccc gtcaggcgga accaggacag tccctgttcc
27840

taacaatgca ctgaggccga gtgctgcagc tactgatcgg gctcgacgct gattaggtcg
27900

gaatcttagg agcattccaa gctccgtacc ccctccagtg gattcattgc aggaggatca
27960

tattttttct cattggttgt tattgtcata attttcaaaa gcacaatgca atgagacagg
28020

caggtggtag agtgaacggc cagaaagggc atctcatggt tatatgttgt tgaaatttac
28080

gatgcaagta gtagggaaga agaatatata aagagatggt ccttttccag agagtgttta
28140

ggtctgatcc ctcataatta tttaatgagt gaaagctttg ttcaagctat aacttactga
28200

gtaggttgaa tgttgatctg attcattcct gaggtatcag gattgatgcc tgaaacatca
28260

atcatccatt gtcagatgcc gtaactaact aactatgaat ctcaacatag ttatatgttg
28320

ccaatctagc cacggtgact agaaccttga gatggactta gactagacat gggtcgcggg
28380

caatgacata tagaatcttt gaaatcgaca ttaattaagt atgtggagat tctttgtgga
28440

ggcacggtaa tgtgtctatc tagcaacgcg gtcaagcatc agtctcaggc acagcccggg
28500

tgtcgttttt ggttgcaatc ttccgccatc ccattccaaa ggcaaacaca aacgtgcacg
28560

ccgtagctcc cactgctaag taaaaagtat gatcaacggc gagactgtaa gctttttacaa
28620

cccctggaag gttattcttg ctgaccacat ctctgaagcc agtcgcccct gctgccgtca
28680

cggcctgcgt gtcgacagtg ggcgcatact tgctcaggcc agttctcaaa ccggacccaa
28740

agacaagggt agcaaagtcc aggaagagcg atcctccaaa cgtctgtcca aacacggcga
28800

gagaaattcc gagggcacct tgttcgggcg aaagcgtgct ttggatggcg atgataggct
28860

ggccattgag tattgatgtc agcgtctagc ggttgcatgc tcttcttgct ttgatacaaa
28920

gccgaaagcg tgagagatga tcaaagggtt catagcttac cgtttgcatg ccacaaccac
28980

gaccgaagcc cgcgataaat tggtagatga cccatttcac agttgatgta tggggctgga
29040

aggtggatac cagacctgcg cctatggcga cgagaacagc gctgcctagg gcccaaggca
29100

aatagtatcc tgtctttcca actggtgcgt catatgtcag tatacacgat atccaagccc
29160

gatgtcagac ggttgtggca agaaaggagc catagaaatg gacgggggtg agaaaaatgt
29220

gtacgcgagt ttcacttact tgcgaagcca gaaaccatag ccataatgac ttgtccaaga
29280

attccaggca acatgtacac accactcagt gtgggagaaa catccttcac agcctggaag
29340

tagatcggta gatagtagga aaagacaagc aaggagccag agaaaaagcc cataaataaa
29400

caagagcacc acacttgctg tttaccagcc actgagccag gaatcatggc aacagcatcg
29460

ccaacatgac gctcccatag cacgaacgca atcagagcaa accctccgcc acagaacagg
29520

ccgatgatga cggaacttcg ccagggtgtag gtcgaccctc cccattctag tgcgagggaa
29580

atcatggttg cgaaggctgc aaagaccaca aagcctacaa ggtccagttt gcgaagtgtg
29640

gattttatgt tggccattgg ttgtcggtc gagagttcgc tgtccgtgga tgaaattcgg
29700

tcgggtatgg tgatgacgag aaggaggaat gcagcgacag cgccgatggg gagattgata
29760

taaaagcctg aattccaagt gagaacatgg acaacaatca taaaaaggcc aaaggtcaac
29820

atacaccatc gccaaagtggc gtgttgagtg aaagcacctc cgagcagtgg tccacagaca
29880

atggcaatct gactaactga aaacatattg tcagacgacg aaccgttcgt ttgggggtaca
29940

tcagatcttg agatgacata cgacccatca tcactccaat caaaacttca tatgcgaggt
30000

cagcgtgtac acggcaccca gcgacttcc aaaaatcggg tcccttacct ggttgcttgt
30060

gcttaggagc agctgttgag aggattgtga gggctccgtt gacaagacct gagcctccca
30120

ttccagcaac ggcccgccca acaatcaaca tgggtggaaga tcttgcgga ccgcatagca
30180

ccgagcctag ttcaaaaata cagaggaagg caaagaaagt gtacttcaag .cccaagagtg
30240

tatacaattt accggccagg ggctggagag cacagctaaa tatgatgtta gctaattctgt
30300

tcgtacaatg aacaaggta aggagaacag agccatactt agccagaaga taagcactgc
30360

cgtaccaccc tacatcggtc agagagtga actcgcttgt gatatgtggg attgcctgtg
30420

gctggagtca attgactgtg ctgcgctctg ttctgaggta gccaccatct taccgtgacg
30480

ataatggaca tatcaaggag catcaaaaat gctacgaaag taactgaagc aaccaccagc
30540

ccgagcttga ggccctgtgat gtgctgggac ttggactcag tcgcttcgag cgtgtcattt
30600

tgactttctt ccttctgtgg ccttggttcc ccttcttttag ggggtagagg ttctgacatc
30660

gcgcaattcc ttccgacttt tgcttcaagg ggcggtgtga atctctactg cgcggcgctt
30720

ctatagtacc tgtgttttgg tgtatgaatg atctcgctct cgttgttttcg ttaagggtccg
30780

ctagcctgaa gtcagattga tggatgggga tcaggggaaa ttggcgacgt ctttaatttt
30840

gctttttctt gttaccggaa gtgttgccgt attagcgtgt ctgggcttat ttacgacgca
30900

caagatgcat tgaactggcc ccactgctag atctcactag tattgtgggt gtaatttacc
30960

tatactccat attgactggg caggttttga acacaacca cccccccca tactacacat
31020

tagttttgca tattttcctg ggggccaaaa aaaccccaaa aggcttcaat attttgccgc
31080

caatggagag tgtaactaat ttggcccaca ctccggtggt atcaatcgga tctcactgca
31140

tatatgatga aagcaagagg gggcaggaga tacgctcttt attggctgtc tgcgcgaagc
31200

tgggcaaatg caaataaaaa gacaaacaac cagctggaag accgggcgac aaacatgggt
31260

tacctaacac cctcgatccc aacaatgtgc atgttaatca atgtgctccg tggggagtat
31320

gaactataac atacgaagca gccattcatg tcaaaaaaaaa aaccaggcga atgggcgtcg
31380

tcaacggttt cacataagta ctatattgta ctaactaccc gtgagactgg agagaacagt
31440

ctcgcgcgaa gaaacgataa gagcatcggt catatcggtc catctcggtc taagtgtatg
31500

agaatattcc gacgtgaatc catccgtcag tgatcaatgt ctccaagtaa ttcatcattt
31560

caattaccct cgctttactc cgtagaatac aagaccttac tagcgcaaac aagtgggggc
31620

taacggtgtg atctccttcc gttgcggccg ccacctcggt tccagccgta atacgacgac
31680

ccgtctatcg cgacccccta gccttggcca tttttggcgt tacagtaaag ctttggagag
31740

aaacgccaag ggaaaatgct agccaccaat tctataaatt actcttcaca tgcagctagt
31800

atcactggta agtctacggg gcacatgtaa aatTTTTatt actttctaata atctttcca
31860

agttcttttc cacggggccc caatgcttaa aatactcaaa agacgtgaaa aacctgcaag
31920

ccgccagtga tatcacacgt aatgcctcaa cagcctgatt ccgagccatt atatgctgtt
31980

tgatgatctc aaattgagat ggcgagcgt ggatctggga aattggtagt gggattggta
32040

tagaaacgta agtgcagaag accatgtaat aagtacatat ggaggctatg tgatggcccg
32100

atctagtttc ttcaatatag cgctgggtat aaaaaaaagc aggggctttc tcagggtaat
32160

gtcgcagtct acaacgagtg gcgtccactg acagggaag gcgagcggg ctatgctacc
32220

ttcaatttcc atagaggggg gatgcacat ctccgacaat ctatagttac tcaaacaggt
32280

acggtactaa gcaatattgt gtttcttcgc taatgcgaat atttccttat agcaacgtcg
32340

caacacattt atcgtcttcc ctgaggcctt tgttgacttg ggctcttcgt ctccggcttc
32400

gtcactccaa agcacagata ggagacgaga ggccggcggt atgggttttat tttcagcgcc
32460

aaggatttgc cacgatgtgc ttggcatatc tgataggacc tattccccct ctcccgtca
32520

gcgcattgct gatgtatgca agggaagaaa agactggtgg ttatcggtcc cacttactag
32580

acgaatagat gccgcagccc cgtgctcctg tgctatcccc aaagcagtct caatctcact
32640

caatagtcga aggcttacac gcaatgtcgt gcatgcagaa gataaggcgt gcatgaatgg
32700

gtcgagatgt gaaatgagct cgccgatatg aagattagag tgaaacgagg gaagtgcctc
32760

ggctcttcca ttgtcatttc tagtggttga gccagaccag taccaatcca ttcgtgtgct
32820

ttgcttttgt ccacaagggtt gggctttcat cacctcggat agtagcagct gggaaagtga
32880

tgtcatgatt ttgacagaca acatgtagca atgcaccgcc atgaacaagt tcttggtttg
32940

cagacaccca tctaacatgc tgctattgct gctcgtgatc acacgttctt gaagatgtag
33000

tagcaatcta ccaaaggcat tcaaaaagtc ccctatcggg tctaggaaga agcttttagcg
33060

acaatcaaga ggcagtaaac aggcagaatt gaaaatctca cagcttaaaa ttttttgctt
33120

gggccattcc acagtcaccc cgtggagtat tacctctagg tctgtgaca catccgacag
33180

actttcgaaa aggtctcgtt gcgtgttgct tgtgttggtat tgtccggatg acgagttccc
33240

ctctacttcg aggtcaaaca gcgatggcga gacaggcgcc gttgcatcca aagggccttc
33300

aaagtcgtag cctagatctg gtatccccga agattcattg ctggtggcat cgtcgcgaaa
33360

tgtatttggc tgaggccagc cgccgggaaa cgactcggga tcatcaaagt tgattgatgt
33420

atcatagaat tgcagggttg ccgctgatgg ttctgataat gtttccttga gtgccgaggt
33480

gccaatatgc gtaggtggtg agcagtaagg tggaggagtc tctgccaatg atgagaagac
33540

cgtagaagat gtcgcggtca tcggttgtga ggtttctgtg gctctttagt ttccagctgc
33600

ggcttcttta tgtaaattgc gcttgggtag cctttcgctg tacacacacc ttaatccggc
33660

ttgttgacaa cgttgacact gagcacggac taaattggca ttgctaccgg tacatttgag
33720

cttttgtgca tgacaccggt cacatgagcg tcgaaacgcg cgacggcgta ggttcgtcgg
33780

aatcgttgca tgcggcaggg acataattat tggattaaga tcaaataatg tgaggtgaga
33840

ctttgcatgt tcctggatct ttatgtattg gaattggaga gtaagctcgt gcaggagata
33900

agttcaggtc gtcttgctgg aagacttact aagttatatg caaacaagtg ttttcgagcg
33960

gacaccaaaa gccaatagtc ttactatgaa tgtcttttca gtcacccgga gaaatactct
34020

tagcctctgc tcttatgcga gctcatcaaa gctgggcata catacccat ccagcgccac
34080

gtattacact agaaagagtt ctaaaagaaa tagattcggc ccccatctg gctatcatat
34140

atgccagatg aaatacctgt aacgtggggc ataaaaaggc aggctctagt ctaccagcag
34200

atc
34203

<210> 2

<211> 34203

<212> DNA

<213> *Penicillium citrinum*

<400> 2

gatctgctgg tagactagag cctgcctttt tatgccccac gttacaggta tttcatctgg
60

catatatgat agccagatgg ggggccgaat ctatttcttt tagaactctt tctagtgtaa
120

tacgtggcgc tggatggggt atgtatgccc agctttgatg agctcgcata agagcagagg
180
ctaagagtat ttctccgggt gactgaaaag acattcatag taagactatt ggcttttggt
240
gtccgctcga aaacacttgt ttgcatataa cttagtaagt cttccagcaa gacgacctga
300
acttatctcc tgcacgagct tactctccaa ttccaataca taaagatcca ggaacatgca
360
aagtctcacc tcacattatt tgatcttaat ccaataatta tgtccctgcc gcatgcaacg
420
attccgacga acctacgccg tcgcgcgttt cgacgctcat gtgaccgggtg tcatgcacaa
480
aagctcaaat gtaccggtag caatgccaat ttagtccgtg ctcagtgtca acgttggtcaa
540
caagccggat taagggtgtg gtacagcgaa aggctacca agcgcaattt acataaagaa
600
gccgcagctg gaactacaag agccacagaa acctcacaac cgatgaccgc gacatcttct
660
acgggtcttct catcattggc agagactcct ccaccttact gctcaccacc tacgcatatt
720
ggcacctcgg cactcaagga aacattatca gaaccatcag cggcaaccct gcaattctat
780
gatacatcaa tcaactttga tgatcccgag tcgtttcccg gcggctggcc tcagccaaat
840
acatttcgcg acgatgccaa cagcaatgaa tcttcgggga taccagatct aggctacgac
900
tttgaaggcc ctttggtatgc aacggcgcct gtctcgccat cgctgtttga cctcgaagta
960
gaggggaact cgtcatccgg acaatccaac acaagcaaca cgcaacgaga ccttttcgaa
1020
agtctgtcgg atgtgtcaca ggacctagag gtaatactcc acgggggtgac tgtggaatgg
1080
cccaagcaaa aaattttaag ctgtgagatt ttcaattctg cctgtttact gcctcttgat
1140

tgtcgctaaa gcttcttcct agacccgata ggggactttt tgaatgcctt tggtagattg
1200

ctactacatc ttcaagaacg tgtgatcacg agcagcaata gcagcatggt agatgggtgt
1260

ctgcaaacca agaacttggt catggcggtg cattgctaca tgttgtctgt caaaatcatg
1320

acatcacttt cccagctgct actatccgag gtgatgaaag cccaaccttg tggacaaaag
1380

caaagcacac gaatggattg gtactgggtc ggctcaacca ctagaaatga caatggaaga
1440

gccgaagcac ttccctcggt tcaactctaatt cttcatatcg gcgagctcat ttcacatctc
1500

gacccattca tgcacgcctt atcttctgca tgcacgacat tgcgtgtaag ccttcgacta
1560

ttgagtgaga ttgagactgc tttggggata gcacaggagc acggggctgc ggcattctatt
1620

cgtctagtaa gtgggaccga taaccaccag tcttttcttc ccttgcatac atcagcaatg
1680

cgctgaccgg gagaggggga ataggctcta tcagatatgc caagcacatc gtggcaaatc
1740

cttggcgctg aaaataaaac cataacgccg gcctctcgtc tcctatctgt gctttggagt
1800

gacgaagccg gagacgaaga gcccaagtca acaaaggcct caggggaagac gataaatgtg
1860

ttgcgacggt gctataagga aatattcgca ttagcgaaga aacacaatat tgcttagtac
1920

cgtacctgtt tgagtaacta tagattgtcg gagatgggtc atccccctc tatggaaatt
1980

gaaggtagca tagccccgct cgcctttccc tgtcagtgga cgccactcgt tgtagactgc
2040

gacattaccc tgagaaagcc cctgcttttt ttatataccca gcgctatatt gaagaaacta
2100

gatcgggcca tcacatagcc tccatatgta cttattacat ggtcttctgc acttacgttt
2160

ctataccaat cccactacca atttcccaga tccagcgctc gccatctcaa tttgagatca
2220

tcaaacagca tataatggct cggaatcagg ctgttgaggc attacgtgtg atatcactgg
2280

cggttgcag gtttttcacg tcttttgagt attttaagca ttggggcccc gtggaaaaga
2340

acttggaag attattagaa agtaataaaa attttacatg tgccccgtag acttaccagt
2400

gatactagct gcatgtgaag agtaatttat agaattggtg gctagcattt tcccttggcg
2460

tttcttcca aagctttact gtaacgcaa aaatggcaa ggctaggggg tcgcgataga
2520

cggtcgctg tattacggct ggaaccgagg tggcggccgc aacggaagga gatcacaccg
2580

ttagcccca cttgtttgcg ctagtaaggt cttgtattct acggagtaaa gcgagggtaa
2640

ttgaaatgat gaattacttg gagacattga tcactgacgg atggattcac gtcggaatat
2700

tctcatacac ttagaccgag atggaccgat atgaccgatg ctcttatcgt ttcttcgcgc
2760

gagactgttc tctccagtct cacgggtagt tagtacaata tagtacttat gtgaaaccgt
2820

tgacgacgcc cattcgctg gttttttttt tgacatgaat ggctgcttcg tatgttatag
2880

ttcatactcc ccacggagca cattgattaa catgcacatt gttgggatcg aggggtgttag
2940

gtaaaccatg tttgtcgccc ggtcttccag ctggttgttt gtctttttat ttgcatttgc
3000

ccagcttcgc gcagacagcc aataaagagc gtatctcctg cccctcttg ctttcatcat
3060

atatgcagtg agatccgatt gataccaccg gagtgtgggc caaattagtt acactctcca
3120

ttggccgcaa aatattgaag ccttttgggg tttttttggc cccaggaaa atatgcaaaa
3180

ctaattgtgta gtatgggggg gtgtggggtt tgttcaaaac ctgcccagtc aatatggagt
3240

ataggtaaata tacaaccaca atactagtga gatctagcag tggggccagt tcaatgcatc
3300

ttgtgctgctg taaataagcc cagacacgct aataccgcaa cacttccggt aacaaagaaa
3360

agcaaaatta aagacgtcgc caatttcccc tgatccccat ccatcaatct gacttcaggc
3420

tagcggacct taacgaaaca acgagagcga gatcattcat acacaaaaac acaggtacta
3480

tagaagcgcc gcgcagtaga gattcacacc gcccttgaa gcaaaagtcg gaaggaattg
3540

cgcgatgtca gaacctctac cccctaaaga aggggaacca aggccacaga aggaagaaag
3600

tcaaaatgac acgctcgaag cgactgagtc caagtcccag cacatcacag gcctcaagct
3660

cgggctggtg gttgcttcag ttactttcgt agcatttttg atgctccttg atatgtccat
3720

tatcgtcacg gtaagatggt ggctacctca gaacagagcg cagcacagtc aattgactcc
3780

agccacaggc aatcccacat atcacaagcg agttccactc tctgaacgat gtaggggtggt
3840

acggcagtcg ttatcttctg gctaagtatg gctctgttct ccttgacctt gttcattgta
3900

cgaacagatt agctaacatc atatttagct gtgctctcca gccctggcc ggtaaattgt
3960

atacactctt gggcttgaag tacactttct ttgccttcct ctgtattttt gaactaggct
4020

cggtgctatg cggtgccgca agatcttcca ccatgttgat tggtgggcgg gccgttgctg
4080

gaatgggagg ctcaggctct gtcaacggag ccctcacaat cctctcaaca gctgctccta
4140

agcacaagca accaggtaag ggaaccgatt ttggaagtc tgctgggtgc cgtgtacacg
4200

ctgacctgcg atatgaagtt ttgattggag tgatgatggg tcgtatgtca tctcaagatc
4260

tgatgtaccc caaacgaacg gttcgtcgtc tgacaatatg ttttcagtta gtcagattgc
4320

cattgtctgt ggaccactgc tcggagggtc tttcactcaa cagccactt ggcgatggtg
4380

tatgttgacc tttggccttt ttatgattgt tgtccatggt ctcacttgga attcaggctt
4440

ttatatcaat ctccccatcg gcgctgtcgc tgcattcctc cttctcgtca tcaccatacc
4500

cgaccgaatt tcatccacgg acagcgaact ctcgaccgac aaaccaatgg ccaacataaa
4560

atccacactt cgcaaactgg accttgtagg ctttgtggtc tttgcagcct tcgcaaccat
4620

gatttccctc gcactagaat ggggagggtc gacctacacc tggcgaagtt ccgtcatcat
4680

cggcctgttc tgtggcggag ggtttgctct gattgcgttc gtgctatggg agcgtcatgt
4740

tggcgatgct gttgccatga ttccctggctc agtggctggt aaacgacaag tgtggtgctc
4800

ttgtttatth atgggctttt tctctggctc cttgcttgct ttttcctact atctaccgat
4860

ctacttccag gctgtgaagg atgtttctcc cacactgagt ggtgtgtaca tgttgcctgg
4920

aattcttgga caagtcatta tggctatggt ttctggcttc gcaagtaagt gaaactcgcg
4980

tacacattht tctccacccc gtccatttct atggctcctt tcttgccaca accgtctgac
5040

atcgggcttg gatatcgtgt atactgacat atgacgcacc agttggaaag acaggatact
5100

atttgccttg ggccctaggc agcgtgttct tcgtcgccat aggcgcaggt ctggtatcca
5160

ccttccagcc ccatacatca actgtgaaat gggtcatgta ccaatttatc gcgggcttcg
5220

gtcgtggttg tggcatgcaa acggtaagct atgaaacctt tgatcatctc tcacgctttc
5280

ggctttgtat caaagcaaga agagcatgca accgctagac gctgacatca atactcaatg
5340

gccagcctat catcgccatc caaagcacgc tttcgcccga acaagggtgcc ctcggaattt
5400

ctctcgccgt gtttggacag acgtttggag gatcgctctt cctggacttt gctaaccttg
5460

tctttgggtc cggtttgaga actggcctga gcaagtatgc gccactgtc gacacgcagg
5520

ccgtgacggc agcaggggcg actggcttca gagatgtggt cagcaagaat aaccttccag
5580

gggttgtaaa agcttacagt ctcgccgttg atcatacttt ttacttagca gtgggagcta
5640

cggcgtgcac gtttgtgttt gcctttggaa tgggatggcg gaagattgca accaaaaacg
5700

acacccgggc tgtgcctgag actgatgctt gaccgcgttg ctagatagac acattaccgt
5760

gcctccacaa agaatctcca catacttaat taatgtcgat ttcaaagatt ctatatgtca
5820

ttgcccgcga cccatgtcta gtctaagtcc atctcaaggt tctagtcacc gtggctagat
5880

tggcaacata taactatggt gagattcata gttagttagt tacggcatct gacaatggat
5940

gattgatggt tcaggcatca atcctgatac ctcaggaatg aatcagatca acattcaacc
6000

tactcagtaa gttatagctt gaacaaagct ttcactcatt aaataattat gagggatcag
6060

acctaaacac tctctggaaa aggaccatct ctttatatat tcttcttccc tactacttgc
6120

atcgtaaatt tcaacaacat ataaacatga gatacccttt ctggccgttc actctaccac
6180

ctgcctgtct cattgcattg tgcttttgaa aattatgaca ataacaacca atgagaaaaa
6240

atatgatcct cctgcaatga atccactgga gggggtacgg agcttggaat gctcctaaga
6300

ttccgacctt atcagcgctg agcccgatca gtagctgcag cactcggcct cagtgcattg
6360

ttaggaacag ggactgtcct ggttccgcct gacggggaga cacttcgaga aggggctgaa
6420

gatgccgggg cagaacggtt gtgcgccatg tgcgccttga ccaggtgacc ggccgctagg
6480

gcagcacata gcgagagctc cccagccaaa acagcgcttc cgatgatgcg cgcaagttga
6540

cgtgcattct caccgggagt ggtcgggtgt gatccgcgga caccaagcat gtcaagcatt
6600

gcgccctggg gctccagaat cgtaccaccg cccaacgttc caacctcaat agacggcatg
6660

gagacagaga tttgaagcga tccgcgaaga ctaaacagga ttagtgaatg tttccaagta
6720

agcggccgct ttcaacttac ttgttcatga gagtgatgca gttagcgctc tccacaactt
6780

gcgccggatc ctgacctgtg gcaatgaaaa tggctgccgc aagattggca gcttgggcgt
6840

tgaagccgcc aactgagcca gccatagcgg acccaatcag atttttcgat atgttgagct
6900

gaaccatgct atccacatcg ctctttaaga catccctgac aacgttcgcc ggtatgatgg
6960

cttcggccac aatgcccttg ccccgcccat cgatccaatt caaagctgaa ggtttcttat
7020

ccgtacagta atttcctgat agggtaataa tattcatatc gctgaaacct gcctctgtcg
7080

ccataacatt cagtgcctgc tccacgccct tagaaatcat attcattccc atagcgctcg
7140

cagtagtagt cttaaatacga atatataagt gagtaccggc gatagttgtc cgcatacttt
7200

gtaagcgcgc aaatctgctg gttgaattga aggcttcttt cattacggtc tggccgacgt
7260

ccgaatcgag ccagatctta gcagcaccag ctcgttcaag gacatcaaac ttcacacacg
7320

ggcctcgtgt cataccgtcg ccagtcagga ctgtcacggc accgccaccg aggttgattg
7380

ccttactgcc acggctagca ctagcgacga ggacgccctc ggtggttgcc ataggaatga
7440

aataactctt gccgtcgata acaataggac cggcgacgcc aacagggact ggcatatagc
7500

caataacggt ctcgcaacat gcaccgagca cgcgttccca ggcgtagttt tcgtacggca
7560

gcttcgagtg ctccagcata cttgtaagct ctgcggtagc cgggtgtcctc gaaatgatag
7620

agcggcgaac cttgacggca cgagtgcagt ctttgagact cttctctagg gcatacccgg
7680

gaacctttcc ccgcaaagac aaggcaacga catcctcatc gttcaactcg ctgattgtgt
7740

tctgcttcag caaattgtcc agttcgattt gtgtgcgaga cacgggaagt tcactagtgg
7800

ctgtctttcc ttctgctcgc ttagtgacct ttagagatgc tttaatgaag actaatgagg
7860

catcactgtc actgtcgggtg gtggtaggag tgaacactct ggtctgagga gcttggagac
7920

ttgattgaat ctgaggggtc tggttctggg cagcgttgaa gctttcggcc tgggtcaagct
7980

caactggatc aactgggtga ctcgggagat taggatcttt gattcccagt ctggcggcct
8040

tgaacagata gctgttcaga gcgacactta gggcaagtgc cacaaacacc catttgagga
8100

ggacgggatc ttccaggctg gtgagcaggc taccgaccat tttccacca actccatact
8160

cgtgtagctg cgaggtacca cgggtgaatgg aaggatactc tagttcgtac ttgatggggg
8220

cgaggacagt gaccatagtc gattgaccgc gccctcttgc ctggaaaagt agttcatcta
8280

gtccacttcc agctaccttg aagggctcaa gcggggggttt aatggccgat ccgctcagac
8340

tttcgggtcca agatgatata ctggacaacg atccactaga agaggcttgg aaaaggggtgg
8400

agccgatggt gacgagggtg acgataagga aaccaacgac catccagaat ttgaacttcg
8460

gaacactgct gcctttcata tcattgccaa acagatatgt acgtgcactg tcttgggcat
8520

cattgctggt cgcgacactc tccgccgtcc gctgactgag accctcatct tccaacgcgt
8580

accgcatggt gatatgacgt ttgaggcggg ttacctcgag cttgatagac agaatcgcag
8640

tgtagaatgt aaacagcagc agacagtcaa agaacaggat caatgcagct agaacacaga
8700

agtgctgtag cccaccttgg atgcctaaga cagcaccgat aactaggagc aggatctcga
8760

ccacgtagtg gcacacgata ttgtaaccct tctcccgaat ggcgcttcgt acggcgtaat
8820

tgatggtact ttcagcaatg gctgtcacgc taccctggtc agactgtatc ttctggggct
8880

ttcgggtgctg cacagcatag gacaaaacag ccctgggtcag agtgatgctc ttctcaaagc
8940

caacgatcac caccaagaag gggaggcctt cggatagcaa cctcatgctc atcggaaccc
9000

ctagtcttat ggccacgtcg agaccgagga gaaaggcaaa tgttgacgac aaaaggacgc
9060

ttgtagccag ccaaaccctc gatcccaatt ttttcatgct gaggaagagt gagacgaaag
9120

tcaagtgcac tgatatataa cctagcacca tgacaaccac gtcgagcggt tgagcgctct
9180

tgataagatc aagagactct gtccaggtat cgtgcacca ttgagcaagg ctgcgttttg
9240

tgtgagccct ggcagccttc atgatccaca tctggcgctc catctcgatc aattgcgtct
9300

cctgcaattt caggtcggca ctgttggttg ggatttcttg aacagcagcc acgagttccg
9360

gcgcgctgct gtattccaca gagaaggcga aaactttatc tttcgaatag gcggttaaag
9420

ggctcgacgt tgagggaagg tcaatcacag ataggttcac agggagggga gcaaggaatg
9480

gtgaggctgc ttgagatgca accccatatg accccgggaa taccaaggtc attagtgcct
9540

gatggttgaa atctccgaga acatctgcat ccccgctgaa gctctgccac ttccagccat
9600

tctgtgggcc ggtgatcaag cttcgacttc cttcgaccaa agagcccccatt tctgctttat
9660

caacgtttgc ggggccatgg aagaagctgt ctttgagtag tccaacgtat gtggtactag
9720

ctagaatagc tatggtgcaa acggtatgga tcgggtgtag acacgccggt ttggatagaa
9780

attggagtgt ggaggtcaat gcccgatttc ccgagcgtag aggggtgctgc tgattcattg
9840

attccctacc gcgaaagcga gagggtagca acgaagcgac catgctgaaa ggtctgtgct
9900

acagcttgga gtggtacct tagctaggta gtctctgaga aaagaatcta gtcagctctg
9960

caaatgggga cggaaaagca cttcaattgg gaattagggc ttgagataaa gtgcatacct
10020

ccaaaatcga atgagcaacc taatcggtta ggcgcctagg tataatctgc cgtcgtagat
10080

tggaggaagg ttgttcggcc caaggggttg ggagggacaa ctgaacagtt cctaggtacg
10140

ggaaatgagt agaagaaaat aacaaatggc gcgcgcccct gaggctgagg cagcggaaag
10200

attcgcttcc ttatccctgc atctgggtcca cctttatgaa tggattcatg accggtgtca
10260

actgctgcct aggggtataat tggtaagggg taccaagcaa aggatagtag gaccaattgc
10320

actgaaaact agtattttgtg ctcataacta tgctcagttt ccaaggtttt tatgcataaa
10380

tttatccttt attcgagaaa aaagaattct ggggacacca atcaattgcc ctgataccta
10440

ggaatgtgaa cttccaagat tgttccgaaa gtaggccaaa tgaccaataa gacagaacac
10500

tacctaggta tagttatttt gtcatgccta gatccgacat acaaaggagc gtcctcttac
10560

atagacgtcc tgttagacgt ttctaattctg actcgtattg tggtcctttt ttggtggggc
10620

ggcaagctgc atcgatcacg cccggacgag gccacttcgt gaggaatgga aatatattgt
10680

gcctacggag taatgcacca cgaaacacat tcttctcgaa acgactactt acgcagggat
10740

gtatgggtat tattctgtcc acgaaaagcc agtgtcaacc cccccccccc cccccccccc
10800

cggtatcatt tatctcagta aacagcaacc tgaacaagat acccaggtag acaagaagtc
10860

agtttgaggt atagtgtata gactcgggaa catttttgtgt ggacctccgt acgtgtctct
10920

caaatcggcg tctctcggtc ttgggatacc ttcggagtta cacggggcctt tgttgccaag
10980

gcttcaatat tcggcgcgatg gattttcttt gtgcatgggt ctgagtgggg tgccgtaagg
11040

tatggtattg ctccccgattg ggagttctga cagatgatca tgccgccttc cgaagtagaa
11100

aaaagaggaa agggtcacat gctcatgatg atcgtttgct cgcgatgaat tgcgcttcct
11160

gcataatatt tgtttgcttg tcttagtcaa ccgataatgc aaattttggg gattgtgtat
11220

tgttggaaat tgaattacca actgcttaca ggaccacccc tgcgctcagg ccctcaacaa
11280

accttgggac aggattaccc actaagcctt tccaagcttt tccaaggcct ttggattcgt
11340

ttgggtttgat agctcgtatg cgtatttcgc atctgtgtac ggagtatcgg attctgacag
11400

cctccattat acccgaaaac tacctggccg gcctgacctg tttcgtcttg ttcgacgggt
11460

tcccatcggc gttttgactc gggattatcg tgacgacaga caatgcctcc cgaaccggta
11520

cctctaaggt attgccccga gcatagcatg gtgggtccggg gtttcccatg ggcacagagc
11580

gaatatcgtg tcacgtccaa gatgaaaaca aaccccgaac tatgaatcac gtgtcggggg
11640

cagcttatgc atctatagct atgccaggga cctgtagact gttggaagac tatcaacggg
11700

tttatcacca gggcgactga tatatcagtc aatgaaacaa cgttggaatg aacaataccc
11760

ccgccgtaac cgcaaccgca accgcaaccg caaccgcaac cgcaatggca ggctcggctt
11820

gctctaacac atccacgccc attgccatag ttggaatggg atgtcgattt gctggagatg
11880

caacgagtcc acagaagctt tgggaaatgg ttgaaagagg aggcagtgcc tgggtctaagg
11940

tccctcctc gcgattcaat gtgagaggag tataccaccc gaatggcgaa agggtcgggt
12000

ccgtgagtat ctaacatgca tgcatttata tcttgttttg aatatttgac acaagatttg
12060

agcatcactg aagcttggtt actgactcca aggatgactg gatagacca cgtaaagggt
12120

ggacacttca tcgacgagga tcctgcttta tttgacgccg cgttcttcaa catgaccaca
12180

gaggtcgcca gcgtatgatt atttcaattg atctaaccg ggacgcagag atctaattt
12240

ggacagtgca tggatccgca gtatcggctt atgcttgagg tgggtctacga atcgttgag
12300

agtggatatgt agtgtgggtc atcctcactg taagcaaacg tcactgacca tcatccagcc
12360

ggtatcacca tcgatggat ggcaggctct aatacgtcgg tgtttggggg tgtcatgtac
12420

cacgactatc aggattcgct caatcgtgac cccgagacag ttccgcgtta tttcataact
12480

ggcaactcag gaacaatgct ttccaaccgg atatcacact tctacgactt acgtgggtccc
12540

agcgtgacgg ttgacacggc ctgttcgacg acattgaccg cactgcactt ggcgtgccag
12600

agcttacgta ctggggagtc agatacagcc atcgttatcg gtgcaaactt tctgctcaat
12660

cccgatgttt ttgttacgat gtcaaacctg gggtgagttt tccgaagaag attccagatc
12720

gagagtcttg aactaagcaa tccttggtgc tcaatgacag atttttgtcc ccggatggta
12780

tctcgactc ttttgatcct cgagcgaatg gatatggtcg cggggaagga attgccgctc
12840

tggtataaaa ggccctccct aacgcgttgc gagaccaaga ccctatccga gccgtcattc
12900

gagagacagc gctgaaccag gatggcaaaa caccgcgaat tactgcgccg agtgatgtgg
12960

cgcagaaaag tctgatccag gagtggtacg ataaggctgg gctagatatg tcgttgacct
13020

cgtacgtgga ggcccacgga actggaacac caactgggtga cccccttgaa atctcagcaa
13080

tttcagcagc ttttaaagga catcctctgc accttggctc tgtgaaagca aatattggcc
13140

atacagaagc cgccagtggc ctggccagta taatcaaggc ggccttggcc ttggagaagg
13200

gcttgattcc ccctaattgc cggttcctgc aaaagaacag caagctgatg cttgaccaa
13260

agaacatcaa ggtaaggctt tgcgcattcg cagattcagt tatatgtttc aaaggttaat
13320

gtttcaaaga tccccatgtc tgctcaagac tggcctgtga aagatgggac tcgtcgcgca
13380

tctgtcaata acttcggctt tgggtggttcg aatgctcacg tcattttgga atcatatgat
13440

cgcgcatcat tggccctgcc agaggatcaa gtgcatgtca atggtaactc tgagcatggt
13500

agggttgagg atggttccaa acagagccgc atatacgttg tgcgtgccaa ggacgagcaa
13560

gcttgctggc gaacgatagc aagcctgcga gactacatta aatccgtcgc tgacattgac
13620

ggggaaccct tcctcgccag cctcgctat acactaggct ctcgccgttc cattctgcca
13680

tggacgtcag tgtatgtagc agacagcctt ggcggccttg tttctgccct cagcgatgag
13740

tccaatcaac caaaacgagc gaatgagaaa gtacggctcg gatttgtatt caccggtcag
13800

ggggcgcagt ggcattgcaat gggcagagag ctggtcaata cattcccagt attcaaacag
13860

gcgattcttg aatgtgatgg ctacatcaag caactgggcg cgagttggaa ttttatgggt
13920

aagttgcgag cccgggaaaa gtaatactgt atcaagcttg aggtactaac attcaattgc
13980

acagaggagc tccaccgtga tgagctgacg actcgggtaa atgatgccga atacagtcta
14040

ccactgtcaa ccgctatcca aattgcactt gtgctctcc tttggtcatt gggaattcgg
14100

ccaacgggga taaccagtca ctcaagtga gaggtgctg ctgcctacgc agctggggct
14160

ttatccgcgc ggtcggccat tgggatcact tatatacgcg gtgtattgac cactaagccc
14220

aagcccgcat tggcagccaa aggaggaatg atggcggtag gtcttggtcg cagtgagacc
14280

aatgtttaca tttcgcgtct caaccaggag gacggctgtg tggtggttgg atgtatcaac
14340

agtcaatgta gtgtgacggt gtcgggagat ttgggtgcaa tcgagaaact tgaaaagttg
14400

ttacacgccg atggcatctt taccaggaaa ctgaaagtca ctgaagcctt ccattcaagc
14460

cacatgcgac caatggcaga tgcctttggg gcgtcactga gagatctggt caactcggat
14520

aacaacaacg acaatcccaa tgctgacacc tcaaaggggtg tattatattc atcacctaag
14580

actggtagtc gcatgaccga tcttaaattg ctattggatc ccacacactg gatggatagt
14640

atgctacagc cggtagagtt cgagtcctca ctccgcgaga tgtgctttga tcccaacacc
14700

aaagagaaaag ccgtcgatgt gattattgaa atagggcctc acggagcgcct tgggtggcca
14760

atcaaccaag tcatgcagga tctgggtctg aaaggaacag atataaacta tctcagttgc
14820

ctttctcgcg gcagaagctc gttggagaca atgtatcgtg ctgctacgga gttgataagc
14880

aagggttatg ggctcaaaat ggacgctata aactttcctc atggaagaaa agagcccaga
14940

gtgaaggtag tgagcgattt gccggcgtag ccgtggaatc accaaacccg ttattggaga
15000

gagcctcgcg gcagtcgtga gtccaaacag agaaccatc cgcctcacac tttgataggc
15060

tcacgggaat ctctctctcc tcatttcgcg cctaaatgga aacatgttct ccgtctgtca
15120

gatattccat ggatacgaga tcacgtcgtt ggttcgagca tcattcttcc gggagctggc
15180

ttcatcagca tggccatcga ggggttttca caagtctgcc caccagttgc gggggctagc
15240

atcaactaca acttgcgtag cgttgaactc gcgcaggctc tcataatacc cgctgatgca
15300

gaagcagagg ttgacctgcg cctaacgata cgttcatgtg aggaaaggct cctcggcaca
15360

aagaactggc atcaattttc tgtgcactca atttcgggcg aaaataatac ctggacagaa
15420

cactgcaccg gattaatacg ttcggagagc gaaagaagcc accttgactg ttcaactgtg
15480

gaagcctcac gcaggttgaa tctaggctca gataaccgga gcattgatcc caacgatctc
15540

tgggagtcct tacacgcgaa tgggatatgc cacggaccca tttttcagaa cattcagcga
15600

attcaaaaca atggacaggg ctcgttttgc agattttcca ttgctgacac tgcctcggct
15660

atgcctcact cgtacgagaa tcgacacatc gtccatccta ctactctgga ctcggtgatc
15720

caggcggcat acacggtggt accctacgcg ggaacacgta tgaaaacggc catggtacca
15780

aggaggctaa gaaatgtcaa aatatcctct agcctggctg acttgagggc tggatgatgct
15840

ctggacgcac aggccagcat caaggatcgc aactctcaat ctttctctac cgacttgga
15900

gtgtttgatg actatgatag cggttcttct ccctcggacg gaatcccagt catagagatt
15960

gaaggccttg ttttccagtc ggttggaagc agcttctctg accaaaagtc agactccaac
16020

gacacagaaa atgcctgcag ctcttgggtt tgggcccctg acatcagctt gggatgactcc
16080

acttggtca aagaaaagtt gagcactgag gctgagacga aagaaacgga actcatgatg
16140

gacctccgaa gatgcacgat caactttata caggaggctg tcaactgattt gacaaattct
16200

gatatccaac atctggatgg ccaccttcag aagtatttcg attggatgaa tgtccaattg
16260

gaccttgca gacaaaacaa gctcagccca gccagttgcg actggctaag tgacgatgct
16320

gagcagaaga aatgcctaca ggccagagtc gctggagaaa gcgtcaatgg cgagatgatt
16380

tctcgtctag gacctcagtt aatagcaatg ctacgccgcg aaacagagcc acttgagttg
16440

atgatgcaag atcagctgct aagcagatac tacgtcaacg caatcaaattg gagccgatca
16500

aacgcacaag ccagcgagct gatccgactt tgcgcccaca agaaccgcg ttctcgatt
16560

ttggagattg gcggaggcac gggcggctgc acaaagctta ttgtcaatgc attgggaaac
16620

accaagccga tcgatcgta tgacttcacc gatgtgtctg ccgggttttt cgagtcggcg
16680

cgtgagcaat ttgcggattg gcaagacgtg atgactttca aaaaattgga tattgaaagc
16740

gatcccgagc aacaagggtt tgaatgtgcc acctacgatg tggtcgtggc ttgccaggtc
16800

ctgcatgcaa ctcgatgcat gaaacgaaca ctgagtaacg ttcgaaaatt gctcaagcct
16860

gggggcaact tgattttggt tgagactacc agggatcagc tcgatttggt ctttaccttc
16920

ggactgttgc caggttggtg gctcagttag gagcctgagc ggaagtcgac gccatcgctc
16980

actaccgatc tttggaacac catgttggac acgagcgggt tcaacgggtg ggaattggag
17040

gttcgtgatt gtgaagacga tgagttttac atgatcagca caatgctatc gacggctaga
17100

aaagagaata caaccccgga tacagtggca gaatcggagg tgcttttgct gcacggagcg
17160

ctccgacctc cttcatcttg gctggaaagt ctccaggcag caatttgatg aaagaccagt
17220

tctagcccat cgatcaacgc tctgggagag gtagatacca ctggaaggac atgcattttt
17280

cttggggaaa tggagtcctc gtccttgga gaggtgggaa gcgagacctt caaatccatc
17340

accgcgatgc tgaataactg caacgcactt ctctgggtgt ctagaggagc agccatgagc
17400

tccgaggatc catggaaagc tctacatatt ggtctgctgc gtaccatccg caacgaaaat
17460

aacgggaagg aatatgtatc gttggatctc gatccttctc gaaacgcata caccacagag
17520

tccctgtatg ctatctgcaa tatcttcaat ggccgcctcg gcgacctttc cgaagacaag
17580

gagtttgaat ttgcagagag aaacggcgtc atccacgtac cgcgactttt caatgaccgc
17640

cactggaagg accaagaagc ggttgaggtc aactgcagc cggtcgagca acccgggcgt
17700

cgtctgcgga tggagggtga gacgccaggg ctcttagact ccctgcaatt tcgagacgac
17760

gaaggacgtg aaggcaagga tcttccggat gattgggtag aaatcgaacc caaagctttc
17820

ggtctcaatt ttcgggatgt catggttgcc atgggtcaat tggaggccaa ccgtgtgatg
17880

ggcttcgaat gcgccggagt gatcaciaag ctcggtggag ctgctgccgc tagccaaggc
17940

ctcagattag gggaccgcgt atgtgcacta ctgaaaggcc attgggcgac cagaacacag
18000

acgccgtaca ctaatgtcgt ccgtattccg gacgaaatgg gcttcccaga agccgcttcg
18060

gtccccctgg ctttcaactac cgcatatatt gcgctttata ccacggcaaa gctacgacga
18120

ggcgaaagag tcttgatcca cagtggagct ggaggcgctc gtcaagcagc gatcattttg
18180

tccagcttg cgggtgccga ggtcttcgtc acagcgggaa ctcaagccaa gcgtgacttt
18240

gtcggcgata aattcggcat caatccggat catatcttct cgagcaggaa tgacttattc
18300

gtcgacggca tcaaagccta cacgggcgga cttggcgctc atgtcgttct aaactcattg
18360

gcaggtcaac tcctccaagc aagctttgac tgcattggcg aattcggcag atttggtgag
18420

attggaaaaa aggacctgga gcaaaacagc agacttgaca tgctgccatt caccgggac
18480

gtctcttttca catcaattga tcttctctcg tggcaaagag ccaaaagtga agaagtatcc
18540

gaagcgttga accatgtcac aaaactcctc gagacaaaag cgattggctt gattgggtcca
18600

atccagcagc actccttgtc aaacatcgag aaggccttcc gtacgatgca gagtgggtcag
18660

catgttggca aagttgtggt caatgtatct ggggacgaac tgggtcccagt cggcgatgga
18720

gggttctcgc tgaagctgaa gcctgacagt tcttacctag ttgctgggtgg gctgggggga
18780

attggaaagc agatctgtca gtggcttggt gatcatggcg cgaagcactt gattatccta
18840

tcgagaagtg caaaggccag tccattcata accagcttgc aaaatcaaca gtgcgctgtc
18900

tatctacacg catgtgacat ctcagatcaa gatcagggtca ccaaggtgct ccggttgtgc
18960

gaagaagcac atgcaccgcc aattcgaggt atcatacaag gtgccatggt tctcaaggac
19020

gcgcttctat cgcgaatgac attggatgaa tttaatgcag caacacgccc aaaagtacag
19080

ggtagttggt atcttcacaa gatcgcacag gatgttgact tcttcgtgat gctctcatcc
19140

cttggtgggg tcatgggtgg ggcaggccag gccaatcacg cagctgctgg tgcattccag
19200

gacgcacttg cgcaccaccg gagagcccat ggcattgccg ctgtcaccat tgacttgggc
19260

atgggtcaagt ctggttgata cgtggctgaa actggccgtg gtgtggccga ccggctcgct
19320

agaatagggtt acaagcctat gcatgaaaag gacgtcatgg atgtgttgga gaaggcaatc
19380

ctgtgttctt cccctcaatt tccatcacct cccgcagctg tggttacagg aatcaacaca
19440

tccccgggtg ctcaactggac cgaggcaaac tggatacagg aacagcggtt tgtgggactt
19500

aaataccgcc aagtccttca tgcagaccaa tcctttgtct cttcgcataa aaaaggacca
19560

gatggcgtgc gggcccaact aagcagggtc acctctcacg acgaggccat ttctatcgtc
19620

ctcaaagcaa tgacggaaaa gctgatgcga atgtttggtc tggcagaaga cgacatgtcc
19680

tcgtccaaaa acctggcagg tgtcggcgta gactcactcg tcgccattga acttcgaaac
19740

tggatcacat ctgaaatcca tgttgatgtg tcgatctttg agctcatgaa tggtaacacc
19800

atcgccggcc tcgtcgagtt agttgtggcg aaatgcagtt aagttgaagg gttcagtgaa
19860

gccttttgtc tggccaagcg ggtatagctc gacggaggta tagtacgaag gagcatagcg
19920

gccatggtct gaagcctgaa tccaatctga atcgagcctg ggctgagcct gactatttaa
19980

tgcttgactt ctggatagca gtaaataagag atacctgaaa taccattaca gtggccctga
20040

gaagcaacaa agtacacatg tgcactcggt ctcgaagtcg gaagagtgaa tgctttttat
20100

actaccaggg aagctgtctt agcacctcgg aggcttgact gtcaaaagtt ctctcttttt
20160

ctctccatta tgattcccgc aagccttgta aatgcgcggt gaacggtcga aaggcggttg
20220

cacgggcagt gggtagagat tgtggatatg tagtcggaag gcgggaggga gtacttgtgt
20280

ccacgtcggt gcgccgtcct ctctttcgcc tagtcgggga tggtgagtag gaacatcaag
20340

acttaacaga gcctaagccc tcgtcatcgt aagcgccagt caacgcctga gagaatgggg
20400

agatcggtga ttgtaccggg agaaaagctt cattactgcc gacttcccta cgtggcggtg
20460

tagctggcgg tatagaagca gatggccgct ctgcgtagca ggaatacaca ctctctccct
20520

tctctctctc tgtgtttctg tctctcgcac atagccaaag tctacaccac gttcgattac
20580

aaagaaggca tcacaatcga ataaaatgcg ttttatttta ctaacctact cgactaatac
20640

agcacctagt ttctctggga cggaaactat tggaataagc ctggggacgg atgcatattt
20700

gttttagttt gcgtgttata tcttagcacc ggtcatgagg gagcgggatg tcctcgttgc
20760

gccggcgtag catgagcttt gtgggttgat gcatacgaac gctaaaagcg tgacggtagt
20820

atttgtcatc gtctcctggg acaggcttca catcactctg aatcagtata tgagcgagga
20880

gaatcttgat ttccttcgag gcgaagaacc gcccgggaca agcgcgtggg ttccagccga
20940

agccgatgtg atcaccgttg gtattctcca attgagcggg gaaggccttg tctggatcct
21000

cgcgcatgcg cataaatcgg tagggatcat aattttcggg gttttccac acatcagggt
21060

tgttcatgcg gtctgcagcc acagcggcca actcgccctt gggaatgaag aggccattgg
21120

atagagtgat gtctctgaga gcggtactgc gcatagtggc gactcgcacc ggcttgattc
21180

gctgcgtctc tttcatgcag ctgtcgagga gcttcagctt gaacagagag gcaggcgtcc
21240

agcccccttc tccgattaca gtgcggatct cttggcggag aggctgaata aggtctgggt
21300

gcctggcaat gtccacaagg gcaccgacga aaagatccgt cgaggcgtag atgccggcga
21360

aatccatagc gagctgagca cccgccacat cgtaccagcg gccgtcggcg gtgtcttcaa
21420

accattgcat ggtatcgacg tactggggcg gctgcacgcc cttecgctaca catgcggcct
21480

tttcagcacg tcgtcgctga atctcaggat caatgatctt tcgtgcgcgg cgcacttggt
21540

cacgcaatTT gcgtccttgc ggttgaaacc agtgagcgag cggtcgcagt agcatgggcc

m12-U

caaggtccaa tccattggaa tagacaggtg cggtttgcca ctctagtata ttcgcggtat
21780

gtcagccaga ggctcaatgc tcaagacaga aaaattgaca cttaccctcg cttttaccga
21840

acaacttggc aatagtagcg tcggccaagg tagccaatgg ctttgtgtac ttgggggctt
21900

gggtttgtaa ctggttcaaa acaactttgt tgacaagatg tgcattcctg cagatttcct
21960

tgaaccgctc gaatccaggg agatgagagt gaaagtccta tacattcatc agaattctag
22020

agacgtcatt gagttacaac aatggaaaat tcagagggtca tacatccgcc aaaaacttgt
22080

acatgcacat atctttgatt ttccgaaact cgtcggccat ggacgatggg aggatgggtc
22140

aatagccgga atcaacaatg aagcgcaggg gcttgctcgtt tttcgagaac caagcttcga
22200

tccagctcgg accatacgta tcgaagtect gcctagccct catggctcgtc aactcccacc
22260

atTTTTTggg attatagact tgcagttcgg actggcgccc ccgcaaacgg taggcgatga
22320

gactaagaag cactgcgacc gccacaaggg cttgaggggt cgatacccat tggtagatt
22380

cgacggtcag aagaacctgg ccgagcattg cgtgagacag ataggacctg tgcacaccag
22440

tggaaaagaa gaaagagcga agaattgagag cgctgcgacg gtttataatc gaataacagc
22500

actaatgctt ctgggatttt gtggccgaga gcactcttcc agtcaacctt gaaaaaaaaa
22560

aaaccccccc cccaatcgaa gtttacctgg atggggcagt tcggttgttt cctttaggag
22620

cagcttcacc gagcagcaca agaacaatcc gagtgaaaaa ctcggtttca ccttgataca
22680

gccaatgat attcacgttt gattcattca gcctcgtgtg accgaataac gccgtatgga
22740

ggaatggcta ttcgtgcacc gaatgacgcc gggaggggtt gctaggtgcc gagcttgcat
22800

tgctgggaag tgggggcatt tgagtactag aatggatctt gaaattgtcc gaatctagat
22860

gagtactgat acgtgcaagt aaatataacg acggtatcgg ttgcaaggcc ggcttgttcg
22920

ctcagagatt caactctgcg attctgtaag aacaaatggt gtgcccggca tgcagtgaga
22980

agatctactg acgcaagaca aggtttaatc ccaatcctat cgccccaaaa caggatcagc
23040

agttatggat caagccaact atccaaacga gccaatgtg gtagtgggaa gcggttgctg
23100

gtttccaggt ggtgtcaaca caccatcaaa actttgggag ctgctcaaag agccccggga
23160

tgtacagacc aagatcccta aggagagatt tgacgtcgat acattttaca gccccgatgg
23220

cactcaccoc gggcgcacga acgcaccctt tgcatacttg ctgcaggagg atctacgcgg
23280

ttttgatgcc tctttcttca acatccaagc tggagaggcc gaaacgattg acccacagca
23340

aaggctgctg ctggagacgg tctatgaagc tgtatccaac gcaggcctac ggatccaagg
23400

ccttcaagga tcctctactg ctgtgtacgt cggtatgatg acgcatgact atgagactat
23460

cgtgacgcgt gaattggata gtattcctac atactctgcc acgggggtag ctgtcagtgt
23520

ggcctccaac cgtgtatcat acttcttcga ctggcatggg ccgagtgtga gtgccactca
23580

gtgagcgaga cagataaaga caagaggaga tggaggatcg aatgattatg cagatgacga
24660

agagtatatg gctcctccac acaagccgac agcagtggta acagaggtga cctcagatgc
24720

agatgcatgc agcttgcccc ttgtgctttc atcgaagtcg cagcgctcca tgaaggcaac
24780

gctagaaaat atgctccaat ttctggaaac gcatgatgac gtggacatgc atgatatcgc
24840

atatacctta cttgagaaac ggtctatctt gcccttccgt cgtgcgattg cagcacacaa
24900

caaggaagta gcccgcgcgg cactggaggc tgccatcgcg gacggtgagg tcgtcaccga
24960

cttccgcacc gacgcgaatg acaaccctcg cgtactaggt gtctttactg gccaaaggtgc
25020

acagtggccg ggcattgctga agaagctcat ggtgggtatg ccatttgtga gaggcattct
25080

cgaagagctg gataattcac tgcaaact gctgaaaag tatcggccta cgtggacact
25140

gtatgaccag ctcatgcttg aaggggatgc ctcaaacgtc agactcgcca gcttctccca
25200

gcctctatgc tgcgccgtac aaatcgttct ggtccgactt ctcgctgcag ctggtatcga
25260

gttcagtgca attgtcggcc acagttcagg tgagattgcc tgtgcctttg cggcaggatt
25320

catcagtgcc actcaagcta tccgtattgc gcatctgcgt ggagttgtgt ccgcggagca
25380

tgctctttct ccaagcggcc agacaggcgc tatgctagcg gcaggtatgt cgtacgatga
25440

cgcaaaggaa ctatgcgagc tcgaagcctt tgagggtcgg gtctgcgtcg ccgctagcaa
25500

ttcaccggat agtgtgacct tctccggcga catggatgct atccagcacg ttgaaggtgt
25560

cttgagggat gaatccactt ttgccagaat cttgagagtt gacaaggcct accattcgca
25620

tcacatgcac ccatgcgcag ctccatatgt caaggcattg ctggagtgcg actgtgctgt
25680

tgccgatggc caaggtaacg atagtgttg cttggttctct gccgtccacg agaccagcaa
25740

gcaaattgact gtacaggatg tgatgcccg cttattggaaa gacaatctcg tctctccggt
25800

cttggttctcg caggctgtgc agaaagcagt catcactcat cgtctaatacg acgtcgccat
25860

cgaattggc gccaccctg ctctcaaggg tccgtgtcta gccaccatca aggatgctct
25920

tgccggtgtg gagctgccgt ataccgggtg cttggcacga aacgttgacg atgtggacgc
25980

ttttgctgga ggtctgggat acatttgga gcgtttcgga gttcggagta tcgacgccga
26040

gggcttcgta caacaagtcc ggcccgatcg tgccgttcaa aacctgtcaa agtcattgcc
26100

cacatactct tgggatcata ctcgtaata ctgggcagaa tctcgctcca cccgccagca
26160

tcttcgtgga ggtgcgcccc atcttctgct tggaaagctt tcttcttaca gcacagcatc
26220

gaccttcag tggacaaaact tcatcaggcc ccgggatctg gaatggctcg acggtcatgc
26280

gctacaaggc cagactgtgt tccccgtgc tgggtacata attatggcca tggaaagctgc
26340

catgaagggtg gctggtgagc gtgccgcca agttcagctc ctggaaatct tggacatgag
26400

catcaacaaa gccatcgtgt ttgaagatga aaacacctcc gtggagctga acttgacagc
26460

cgaagtcacc agtgacaatg atgcggatgg ccaagtcacg gtcaaatttg ttattgattc
26520

ctgtctggca aaggagagtg agctttcgac atccgccaaa ggccaaatcg tcataaccct
26580

tggcgaggca tcaccgtcat cgcagctttt gccgccacct gaggaagagt acccccagat
26640

gaacaatgtc aacatcgatt tcttctatcg ggaacttgac ctcttggggt atgactacag
26700

caaagacttc cgtcgtttgc agaccatgag aagggccgac tccaaagcta gcggcacctt
26760

ggctttcctt ccacttaagg atgaattgcg caatgagccc ctcttgctcc acccagcgcc
26820

cctggacatc gcgttccaga ctgtcattgg agcgtattcc tctccaggag atcgtcgcct
26880

acgctcattg tacgtgccta ctacgttga cagagtgact ctgattccat cgctctgtat
26940

atcggcgggt aattctggtg aaaccgagct tgcgtttgac acaatcaaca cacacgacaa
27000

gggtgatttc ctgagcggcg acatcacggt gtacgattcg accaagacaa cgcttttcca
27060

agttgataac attgtcttta agcctttctc tccccgact gcttcgaccg accaccgaat
27120

cttcgcaaag tgggtctggg gaccctcac gcccgaaaaa ctgctggagg accctgcgac
27180

gttgatcata gctcgggaca aggaggacat tctgaccatc gagcgaatcg tttacttcta
27240

catcaaatcc ttcctagccc agataacccc cgacgaccgt caaaatgccg acctccattc
27300

ccagaagtac attgaatggt gtgaccaggt tcaggccgat gctcgggctg gccaccatca
27360

gtggtaccag gagtcttggg aggaggacac ttctgttcac attgagcaaa tgtgtgaaag
27420

gtacacccaa agctgttccg tgttttttca ttcttttata ttaacctttt acttgaagca
27480

actcgtccca cccacatgtg cgcctgatcc aaagggtagg caaagaatta atttcaattg
27540

ttcgcgggaa cggggatcct ttggatatca tgaaccgcga tgggttggtc accgagtact
27600

ataccaacaa gctcgccttt ggctcagcaa tacacgtcgt tcaggatctg gttagccaaa
27660

ttgctcatcg ctaccaatcc attgatatcc ttgagatcgg taagtcgaat ctgaaatgta
27720

agtaactagg cagtttgcta atctgtcgtt cgcttttttag gcttgggtac aggcatcgcc
27780

acgaagcgcg ttcttgcata acctcaactt ggtttcaaca gttacacttg cactgacatc
27840

tcggcggatg ttattggcaa ggcccgtgaa caactttccg aattcgacgg tctcatgcag
27900

tttgaggcac tagacatcaa cagaagccca gcagagcaag gattcaagcc tcactcctac
27960

gatctgatta ttgcatccga tgtcctccat gccagctcca acttcgagga aaaattggct
28020

cacataaggt ccttgcctca gccgggtggt cacttggtta ctttcgggggt caccatcgcc
28080

gagcctgctc gcctcgccctt catctctggg cttttcgctg atcgatggac tggagaagac
28140

gaaactcgtg ctttgagtgc ctcggggtcc gttgaccaat gggagcatac cctcaagaga
28200

gttggtgttct ctggcgctga tagtcggaca cttgatcgag aggatgattt gatcccgctct
28260

gtcttcagta cacatgctgt ggatgccacc gttgagcgtt tgtatgatcc actttctgct
28320

ccattgaagg actcataccc gccattagtg gttatcgggtg gcgaatcgac aaaaaccgaa
28380

cgcattttga acgacatgaa agctgcccta ccgcatagac acatccactc cgtcaagcgg
28440

ctggaaagtg ttctcgacga cccggccttg cagcctaagt cgacttttgt catcctctcg
28500

gaacttgatg atgaagtgtt ttgcaacctt gaagaggaca agtttgaggc agtcaagtct
28560

cttctcttct acgccggacg catgatgtgg ctgacagaga atgcctggat tgatcatccc
28620

caccaggcca gcaccatcgg aatgttgagg acaatcaagc tcgagaacct tgacttgggga
28680

acgcacgtct tcgatgtcga tactgtggag aacctagaca ccaaattctt cgttgagcaa
28740

cttttgcgct tcgaggagag cgatgatcag cttttggaat caataacatg gactcatgag
28800

cccgaagtgt actggtgcaa gggtcgtgcc tgggtccctc gtttgaagca ggatattgct
28860

aggaacgacc gtatgaactc gtctcgtcgt ccaattttcg gtaactttaa ttcgtccaag
28920

acggccattg cactgaaaga ggcgagggga gcacccatcat cgatgtacta tcttgagtca
28980

accgagacgt gtgattcggt agaagacgct cgtcatgctg gaaaagcaac tgttcgtggt
29040

cgctacgctc ttccccaggc aattcgcgtg ggccatctcg gatacttcca tgctcgtcag
29100

ggcagtattc tggagaatac atgtgaggtg cctgtagtcg ccctggctga gaagaatgga
29160

tctatactgc atgtaccgag aaactacatg catagtctgc ccgataacat ggcggaaggc
29220

gaggatagtt ccttcttggt gtccacagct gcagccctcc ttgccgaaac aattctctct
29280

agcgctcagt cctttggctc tgatgcatca attctgatta tggagcccc aatcttctgc
29340

gtcaaagcaa ttctggagtc ggccaaaacc tacggtgttc aggttcattt ggcaacaact
29400

ctgtccgacg tcaaaactat tccggctcct tggatccgat tacatgccaa ggaaaccgac
29460

gctcggctga aacacagcct gccgacaaac atgatggcat tctttgactt gtctaccgac
29520

cggactgctg ccgggataac caaccgtttg gccaaagtgc taccaccag ttgcttcatg
29580

tacagtgggtg actatcttat ccgaagtaca gcttccacat acaaagttag tcatgttgag
29640

gatattccaa tcctcgagca ctctgtggca atggcaaaaa ataccgtctc tgcgtcgact
29700

gtcgacgaca ctgagaaagt tattacagcc acacaaattc tcttgccctgg tcagctctct
29760

gtcaaccaca atgaccaacg cttcaatctg gccaccgtca tcgactggaa ggaaaatgag
29820

gtgtccgcta ggatttgccc catcgactct ggtaacttat tttccaacaa gaagacgtat
29880

ttgcttggtg gtcttaccgg ggaccttggg cgctctctct gtcgctggat gatcttgc
29940

ggcgcccgcc atgttggtgct cactagccgg aaccctcgac ttgatcccaa atggatcgcc
30000

aacatggagg cacttggtgg tgacatcacc gttctgtcaa tgtaagttga ttgatatac
30060

atcacacctt gctaccacat cctcgtttac ttatccaatt actttcttta gggatgttgc
30120

caatgaggat tcagtcgatg ctggccttgg caagcttgtc gatatgaagt tgccacctgt
30180

tgccggcatc gcgttcgggc ctttggtgct gcaggatgtc atgctgaaga acatggacca
30240

ccagatgatg gacatggtgt tgaagcccaa ggtacaagga gcacgcattc ttcataaacg
30300

gttctccgaa cagacgggca gcaaggcgct cgacttcttc atcatgtttt cgtccattgt
30360

tgcagttatt ggcaatcctg gccagtccaa ctatggcgct gcgaatgcct acctacaggc
30420

tctggcccag caacggtgcg ccagaggatt ggcggtatth tctaccctg aattatcatg
30480

catcgacgtc aagttactaa cgcacaacca cagggatcaa ccatcgatat tggtgccggt
30540

tacggtgtag ggtttgtcac gagggccgag atggaggagg actttgatgc tatccgtttc
30600

atgtttgact cagttgaaga gcatgagctg cacacgcttt tcgccgaagc ggtcgtgtct
30660

gaccagcgtg cccggcagca accacagcgc aagacggtca ttgacatggc ggaccttgag
30720

gggcacagat gaccacctgt tggtaatcgg ctaccacaga ttagttggtg atgggtcaac
31800

aacagaaaac ctgttcaatg agatcgggca gatttacagc ggggtgaaaa tgcagcgacc
31860

atcgacccaa ttctctgata tagccgtcca acagcgggaa aacctggaaa atgggcgaat
31920

gggggacgat atcgcgttct ggaagtccat gcatagcaaa gtctcgtcat ctgcgccaac
31980

cgtgcttccc atcatgaatc tgatcaatga ccctgctgcc aattcagagc agcagcaaat
32040

acagccattc acgtggcagc agtatgaagc aattgctcgt ttagatccca tggtcgcctt
32100

ccgaatcaaa gagcggagcc gcaagcacia ggcaaccccc atgcagttct acctggccgc
32160

ctaccacgtt ttgttggcgc gtcttaccgg cagcaaagac ataaccatcg gcctcgccga
32220

aaccaaccga tccaccatgg aagaaatttc ggcgatgggc tttttcgcta acgtgcttcc
32280

cctgcgcttt gatgagttcg tcggcagcaa gacattcggc gagcaccttg tagccaccaa
32340

ggacagtgtg cgtgaggcca tgcaacacgc gcgggtgccg tatggcgtca tcctcgactg
32400

tctaggcctg aatctcccta cctcaggcga ggaaccaag actcagacac acgccccctt
32460

gttcaggct gtctttgatt acaagcaggg tcaagcggag agtggctcaa ttggcaatgc
32520

caaatgacg agtggttctg cttcccgtga gcgcactcct tatgacatcg ttctcgagat
32580

gtgggatgac cctaccaagg acccactcat tcatgtcaaa cttcagagct cgctgtatgg
32640

ccctgagcac gctcaggcct ttgtagacca cttttcttca atcctcacta tgttctcgat
32700

gaaccggct ctgaagttgg cctagatcgt tcagcgccgt gaattcagat gtgtgggttg
32760

cttaccacgg gtatcccaga tcttgaccct gcgcttcaag atcgaattat ttacttcaac
30780

gaccctcggt tcggaaactt caaaattccc ggtcaacgcg gagacggtgg cgacaatgga
30840

tcagggtcta aaggctccat tgccgaccag ctcaaacaag caacaacttt agaccaagtt
30900

cggcaaactc tgattggtaa gttatctctc atgcgtttcc tgatatcgag ttcaaactaa
30960

caaagttgca gatggtctat ctgagaaact ccgtgttacc ctccaagttt cggacgggga
31020

gagcgtggac ccaaccattc ctctcattga tcaaggtgtc gactccttgg gtgcagtgac
31080

tgtcgggtca tggttctcaa agcaactcta ccttgacctc ccaactcttga ggggtacttg
31140

cggtgcttct gtcgctgatc ttgccgacga cgcggccacc cgactcccag ctacatccat
31200

tccgctgctg ttgcaaattg gtgattccac gggaacctcg gacagcgggg cttctccgac
31260

accaacagac agccatgatg aagcaagctc tgctaccagc acagatgcgt cgtcagccga
31320

agaggatgaa gagcaagagg acgataatga gcaggagggc cgtaagattc ttcgtcgcga
31380

gaggttgctc cttggccagg agtattcctg gaggcagcaa caaatggtaa aagatcatac
31440

catcttcaac aacactattg gcatgttcat gaagggtacc attgacctcg accggttgag
31500

gcgggctctg aaagcctcat tgcgccgtca cgagatcttc cgtacgtgct ttgttactgg
31560

cgatgactat agcagcgatt taaatggtcc cgtccaagtg gttctcaaga acccgagaaa
31620

cagagtgcac tttgttcagg tgaacaacgc tgcggaggca gaggaagagt accggaaact
31680

cgagaagaca aactatagca tctccacagg tgacactctc agactcggtg atttctactg
31740

agtgttggtc atgataaaga tggattagaa attggcaata gagcagatgg caaatctatc
32820

ctgaattcgg cgtcaattga cacacgcata ttcattctaca aatagcgaat tcgtcttgta
32880

tctttgtcaa aattacttct accttcggtg ctcttcttta ttgcagcaat cgtaacatca
32940

agttagatag cgcggttcag agtaccgtaa cggtgataaa tatacctcgg tagcgcgttt
33000

cgaaagactc tgtgaggaag gtgaaacctc caaggcttgg aattgatttc aatccatcct
33060

gtatataaat tcgacgccat tgcaaatagt tccatagtta ctggtttagt gccttggtgt
33120

ggtgatcgag tggttttaga tgtctgtcat gcctgttcag aacgagcctt ccatgatcta
33180

tcctaaaatat gttcacgaaa tatttatgag atggtcgcga ccactataac taaatcaccc
33240

ttggaagggtg agcattcaaa ccgtgtaaga ttagaactat tcaaatttgt tcagtaaaaa
33300

tgtggtatgg actagggcatg agagccagag ccttgctata taccctgttg tctcacctag
33360

acaaatgaac ctgacatctt gaccttttga tatagctggt ggaagcgctt gaccgtctcc
33420

tggacatcac tcggtctggt gggaaaatta tgctttccct gaaactcgag tacatctgca
33480

ttctgaggca ggtaatgtgt ttcaaccatc tgtctcgacc cttggagagc aaaatcttga
33540

cgaccgtgaa gatgcagtgt cggcacgttg attattagct tgctcgtcgtc gtcttgcgcc
33600

tcggctctca tgtaatctct ggcttcatcg ctatagaaac agcaaataca aacagcaatg
33660

ctcattttcg gaaaccatgg cagttttccc atttgctggt gatggagcag caaagtggcg
33720

accaatgcgc cctcagagaa ggccactatg ccgacaatgg gtgcctgtgg gttagttata
33780

gaccaatctt ggacggtctt ttgcacaggc ccgatcacag ccgctactct atcgcccacc
33840

gtggggggttg tcgtgtttgt aacggcggtca tgatgctttt ggaaccaggt gtagtatgga
33900

cccatgcctt ggaagacagg aagcacgccg ggtccggggc tggagctaaa cggcgcggtc
33960

gcatatacga attcaaactc gtttttcaac gccacgcgca gtttagagat ctggacgcgg
34020

aatatggctg ctgagcaccc ggcaccgtgg atgcataaga gagcttttct cggtttgcct
34080

ggcgagaaat ctgtaatcct cgctggactc attttctctt gtggtgtgag ctgtgacttc
34140

gtctgttctg gggaatttgt tagtcattac tgacaaggaa ataacaacga cgtagtattg
34200

atc
34203

<210> 3

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: A mixed primer
which has a DNA sequence deduced from the amino
acid sequence of PKS of *Aspergillus flavus*.

<220>

<221> modified_base

<222> (6)..(6)

<223> i

<220>

<221> modified_base

<222> (9)..(9)

<223> i

<400> 3

gayacngcnt gyasttc
17

<210> 4

<211> 17

<212> DNA

<213> Artificial Sequence

<220>

<221> misc_feature

<223> Description of Artificial Sequence: A mixed primer
which has a DNA sequence deduced from the amino
acid sequence of PKS of Aspergillus flavus.

<220>

<221> modified_base

<222> (3)..(3)

<223> i

<220>

<221> modified_base

<222> (6)..(6)

<223> i

<220>

<221> modified_base

<222> (8)..(8)

<223> i

<220>

<221> modified_base

<222> (15)..(15)

<223> i

<400> 4

tcnccnknrc wgtgncc
17

<210> 5

<211> 19

<212> DNA

<213> Penicillium citrinum

<400> 5

gcatgttcaa tttgctctc
19

<210> 6

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 6

ctggatcaga cttttctgc
19

<210> 7

<211> 18

<212> DNA

<213> *Penicillium citrinum*

<400> 7

gtcgcagtag catgggcc
18

<210> 8

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 8

gtcagagtga tgctcttctc
20

<210> 9

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 9
gttgagagga ttgtgagggc
20

<210> 10

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 10
ttgcttgtgt tggattgtc
19

<210> 11

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 11
catggtactc tcgcccgttc
20

<210> 12

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 12
ctccccagta cgtaagctc
19

<210> 13

<211> 21

<212> DNA

<213> *Penicillium citrinum*

<400> 13

ccataatgag tgtgactggt c
21

<210> 14

<211> 19

<212> DNA

<213> *Penicillium citrinum*

<400> 14

gaacatctgc atccccgtc
19

<210> 15

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 15

ggaaggcaaa gaaagtgtac
20

<210> 16

<211> 21

<212> DNA

<213> *Penicillium citrinum*

<400> 16

agattcattg ctgttgcat c
21

<210> 17

<211> 722

<212> DNA

<213> *Penicillium citrinum*

<400> 17

ggccacgcgt cgactagtac gggggggggg gggggggggg gcttggtcgc tcagagattc
60

aactctgcga ttctgtttaa tccaatcct atcgcccaa aacaggatca gcagttatgg
120

atcaagcaa ctatccaaac gagccaattg tggtagtggg aagcggttgt cggtttccag
180

gtgggtgtcaa cacaccatca aaactttggg agctgctcaa agagccccgg gatgtacaga
240

ccaagatccc taaggagaga tttgacgtcg atacatttta cagccccgat ggcactcacc
300

ccgggcgcac gaacgcaccc tttgcatact tgctgcagga ggatctacgc ggttttgatg
360

cctctttctt caacatccaa gctggagagg ccgaaacgat tgaccacag caaaggctgc
420

tgctggagac ggtctatgaa gctgtatcca acgcaggcct acggatccaa ggccttcaag
480

gacctctac tgctgtgtac gtcggtatga tgacgcatga ctatgagact atcgtgacgc
540

gtgaattgga tagtattcct acatactctg ccacgggggt agctgtcagt gtggcctcca

600

accgtgtatc atacttcttc gactggcatg ggccgagtat gacgatcgac acagcctgta
660

gttcatacctt agctgccgtg catctggccg tccaacagct tagaacgggc gagagtacca
720

tg
722

<210> 18

<211> 760

<212> DNA

<213> *Penicillium citrinum*

<400> 18

ggccacgcgt cgactagtag gggggggggg gggggggggg gactatcaac ggttttatca
60

ccaggcgac tgatatatca gtcaatgaaa caacgttgga atgaacaata ccccgccgt
120

aaccgcaacc gcaaccgcaa ccgcaaccgc aaccgcaatg gcaggctcgg cttgctctaa
180

cacatccacg cccattgcca tagttggaat gggatgtcga tttgctggag atgcaacgag
240

tccacagaag ctttgggaaa tggttgaaag aggaggcagt gcctgggtcta aggtcccctc
300

ctcgcgattc aatgtgagag gagtatacca cccgaatggc gaaagggtcg ggtccacca
360

cgtaaagggt ggacacttca tcgacgagga tcctgcttta tttgacgccg cgttcttcaa
420

catgaccaca gaggtcgcca gctgcatgga tccgcagtat cggttatgct ttgaggtggt
480

ctacgaatcg ctggagagtg ccggtatcac catcgatggt atggcaggct ctaatacgtc
540

ggtgtttggg ggtgtcatgt accacgacta tcaggattcg ctcaatcgtg accccgagac
600

agttccgcgt tatttcataa ctggcaactc aggaacaatg ctttcgaacc ggatatcaca
660

cttctacgac ttacgtggtc ccagcgtgac ggttgacacg gcctgttcga cgacattgac
720

cgactgcac ttggcgtgcc agagcttacg tactggggag
760

<210> 19

<211> 773

<212> DNA

<213> *Penicillium citrinum*

<400> 19

ggccacgcgt cgactagtac gggggggggg ggtttttttt ttttcaaggt tgactggaag
60

agtgtctctg gccacaaaat ccagaagca ttagtgctgt tattcgatta taaaccgtcg
120

cagcgtcttc attcttcgct ctttcttctt ttccactggg gtgcataggt cctatctgtc
180

tcacgcaatg ctcggccagg ttcttctgac cgtcgaatcg taccaatggg tatcgacccc
240

tcaagccctt gtggcggtcg cagtgttct tagtctcatc gcctaccgtt tgcgggggcg
300

ccagtccgaa ctgcaagtct ataatcccaa aaaatgggtg gagttgacga ccatgagggc
360

taggcaggac ttcgatacgt atgggtccgag ctggatcgaa gcttggttct cgaaaaacga
420

caagcccctg cgcttcattg ttgattccgg ctattgcacc atcctcccat cgtccatggc
480

cgacgagttt cggaaaatca aagatatgtg catgtacaag tttttggcgg atgactttca
540

ctctcatctc cctggattcg acgggttcaa ggaaatctgc caggatgcac atcttgtcaa
600

caaagttggt ttgaaccagt tacaaccca agccccaag tacacaaagc cattggctac
660

cttggccgac gctactattg ccaagttggt cggtaaaagc gaggagtggc aaaccgcacc
720

tgtctattcc aatggattgg accttgtcac acgaacagtc aactcatta tgg
773

<210> 20

<211> 527

<212> DNA

<213> *Penicillium citrinum*

<400> 20

ggccacgcgt cgactagtag gggggggggg gtacctagga actgttcagt tgtccctccc
60

aacccttgg gccgaacaac cttcctccaa tctacgacgg cagattatac ctaggcgcct
120

aaccgattag gttgctcatt cgattttgga gagactacct agctataggt accactccaa
180

gctgtagcac agacctttca gcatggtcgc ttcgttgcta ccctctcgct ttcgcggtag
240

ggaatcaatg aatcagcagc accctctacg ctcgggaaat cgggcattga cctccacact
300

ccaatttcta tccaaaacgg cgtgtctaca cccgatccat accgtttgca ccatagctat
360

tctagctagt accacatacg ttggactact caaagacagc ttcttccatg gccccgcaaa
420

cgttgataaa gcagaatggg gctctttggt cgaaggaagt cgaagcttga tcaccggccc
480

acagaatggc tggaagtggc agagcttcga cggggatgca gatgttc
527

<210> 21

<211> 522

<212> DNA

<213> *Penicillium citrinum*

<400> 21

ggccacgcgt cgactagtac gggggggggg gggggggggg ggatccatca atctgacttc
60

aggctagcgg accttaacga aacaacgaga gcgagatcat tcatacacca aaacacaggt
120

actatagaag cgccgcgcag tagagattca caccgcccct tgaagcaaaa gtcggaagga
180

attgcgcgat gtcagaacct ctacccccta aagaaggga accaaggcca cagaaggaag
240

aaagtcaaaa tgacacgctc gaagcgactg agtccaagtc ccagcacatc acaggcctca
300

agctcgggct ggtggttgct tcagttactt tcgtagcatt tttgatgctc cttgatatgt
360

ccattatcgt cacggcaatc ccacatatca caagcgagtt ccaactctctg aacgatgtag
420

ggtggtacgg cagtgccttat cttctggcta actgtgctct ccagcccctg gccggtaa
480

tgtatacact cttgggcttg aagtacactt tctttgcctt cc
522

<210> 22

<211> 541

<212> DNA

<213> *Penicillium citrinum*

<400> 22

ggccacgcgt cgactagtac gggggggggg ggctcacctc acattatttg atcttaatcc
60

aataattatg tccctgccgc atgcaacgat tccgacgaac ctacgccgtc gcgcgtttcg
120

acgctcatgt gaccgggtgc atgcacaaaa gctcaaattg accggtagca atgccaattt
180

agtccgtgct cagtgtcaac gttgtcagca agccggatta aggtgtgtgt acagcgaaag
240

gctaccaag cgcaatttac ataaagaagc cgcagctgga actacaagag ccacagaaac
300

ctcacaaccg atgaccgcga catcttctac ggtcttctca tcattggcag agactcctcc
360

accttactgc tcaccaccta cgcattattgg cacctcggca ctcaaggaaa cattatcaga
420

accatcagcg gcaaccctgc aattctatga tacatcaatc aactttgatg atcccagatc
480

gtttcccggc ggctggcctc agccaaatac atttcgacgat gatgccaaca gcaatgaatc
540

t
541

<210> 23

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 23

atcataccat cttcaacaac
20

<210> 24

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 24

gctagaatag gttacaagcc
20

<210> 25

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 25

acattgccag gcacccagac
20

<210> 26

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 26

caacgcccaa gctgccaatc
20

<210> 27

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 27
gtcttttcct actatctacc
20

<210> 28

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 28
ctttcccagc tgctactatc
20

<210> 29

<211> 1524

<212> DNA

<213> *Penicillium citrinum*

<400> 29
aactggaaga attcgcggcc gcaggaattt tttttttttt tttttttcaa cgaaggtaga
60

agtaattttg acaaagatac aagacgaatt cgctatttgt agatgaatat gcgtgtgtca
120

attgaagccg aattcaggat agatttgcca tctgctctat tgccaatttc taatccatct
180

ttatcatgaa caacactcaa accacacatc tgaattcacg gcgctgaacg atctaggcca
240

acttcagagc cgggttcacg gagaacatag tgaggattga agaaaagtgg tctacaaagg
300

cctgagcgtg ctcagggcca tacagcgagc tctgaagttt gacatgaatg agtgggtcct
360

tggtagggtc atcccacatc tcgagaacga tgtcataagg agtgcgctca cgggaagcga

420

gaacactcgt cattttggca ttgccaatg agccactctc cgcttgaccc tgcttgtaat
480

caaagacagc ctggaacaag ggggcgtgtg tctgagtctt gggttcctcg cctgaggtag
540

ggagattcag gcctagacag tcgaggatga cgccatacgg caccgcgcg tgttgcatgg
600

cctcacgcac actgtccttg gtggctacaa ggtgctcgcc gaatgtcttg ctgccgacga
660

actcatcaaa gcgcagggga agcacgttag cgaaaaagcc catcgccgaa atttcttcca
720

tggtggatcg gttggtttcg gcgaggccga tggttatgtc tttgctgccg gtaagacgcg
780

ccaacaaaac gtggtaggcg gccaggtaga actgcatggg ggttgccctg tgcttgccgc
840

tccgctcttt gattcggaag gcgaccatgg gatctaaacg agcaattgct tcatactgct
900

gccacgtgaa tggctgtatt tgctgctgct ctgaattggc agcaggggtca ttgatcagat
960

tcatgatggg aagcacgggt ggccgagatg acgagacttt gctatgcatg gacttccaga
1020

acgcgatatc gtccccatt cgccattttt ccagggtttc ccgctggttg acggctagat
1080

cagagaattg ggtcgatggc cgctgcattt tcaccccgct gtaaactctgc ccgatctcat
1140

tgaacagggt ttctgttggt gagccatcac caactaatct gtggtagccg attaccaaca
1200

ggtggtcatc tgtgccccag tagaaatcaa cgagtctgag agtgtcacct gtggagatgc
1260

tatagtttgt cttctcgagt ttccggtact cttcctctgc ctccgcagcg ttgttcacct
1320

gaacaaagtg cactctgttc tccgggttct tgagaaccac ttggacggga ccattttaa
1380

cgctgctata gtcacgcgcca gtaacaaagc acgtacggaa gatctcgtga cggcgcaatg
1440

aggctttcag agcccgctc aaccggtcga ggtcaatggt acccttcatg aacatgccaa
1500

tagtggtggt gaagatggta tgat
1524

<210> 30

<211> 784

<212> DNA

<213> *Penicillium citrinum*

<400> 30

aactggaaga attcgcggcc gcaggaattt tttttttttt tttttttttc tttggtgctt
60

ctcagggcca ctgtaatggt atttcaggta tctctattta ctgctatcca gaagtcaggc
120

attaaatagt caggctcagc ccaggctcga ttcagattgg attcaggctt cagaccatgg
180

ccgctatgct ccttcgtact atacctccgt cgagctatac ccgcttggcc agacaaaagg
240

cttcactgaa cccttcaact taactgcatt tcgccacaac taactcgacg aggccggcga
300

tggtggtacc attcatgagc tcaaagatcg acacatcaac atggatttca gatgtgatcc
360

agtttcgaag ttcaatggcg acgagtgagt ctacgccgac acctgccagg tttttggacg
420

aggacatgtc gtcttctgcc agaccaaaca ttgcgcatcag cttttccgtc attgctttga
480

ggacgataga aatggcctcg tcgtgagagg tgaccctgct tagttggggc cgcacgccat
540

ctggtccttt tttatgcgaa gagacaaagg attggtctgc atgaaggact tggcgggtatt
600

taagtccac aaaccgctgt tctgtatcc agtttgctc ggtccagtga gcacccggg
660

atgtgttgat tctgtaacc acagctgcg gaggtgatgg aaattgagg gaagaacaca
720

ggattgcctt ctccaacaca tccatgacgt ccttttcatt cataggcttg taacctattc
780

tagc
784

<210> 31

<211> 764

<212> DNA

<213> *Penicillium citrinum*

<400> 31

aactggaaga attcgcggcc gcaggaattt tttttttttt tttttttttc gaataaaatg
60

cgttttattt tactaaccta ctgcactaat acagcaccta gtttctctgg gacggaaacc
120

attggaataa gcctggggac ggatgcatat ttgttttagt ttgcgtgtta tatcttagca
180

cgggtcatga gggagcggga tgcctcgtt gcgcggcgt accatgagct ttgtggttgg
240

atgcatacga acgctaaaag cgtgacggta gtatttgtca tcgtctcctg gtacaggctt
300

cacatcatat tgaatcagta tatgagcgag gagaatcttg atttccttcg aggcgaagaa
360

ccgcccgga caagcgcgtg ggttcagcc gaagccgatg tgatcacctg tggattctc
420

caattgagcg gtgaaggcct tgtctggatc ctgcgcgatg cgcataaatc ggtagggatc
480

ataattttcg gggttttccc acacatcagg gttgttcatt cggctctgcag ccacagcggc
540

caactcgccc ttgggaatga agaggccatt ggatagagtg atgtctctga gagcgggtact
600
gcgcatagtg gcgcactcga ccggcttgat tcgctgcgtc tctttcatgc agctgtcgag
660
gagcttcagc ttgaacagag aggcaggcgt ccagccccct tctccgatta cagtgcggat
720
ctcttggcgg agaggctgaa taaggctctgg gtgcctggca atgt
764

<210> 32

<211> 765

<212> DNA

<213> *Penicillium citrinum*

<400> 32

aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttctgg aaaaggacca
60
tctctttata tattcttctt ccctactact tgcacgtaa atttcaacaa catataaaca
120
tgagataccc tttctggccg ttcactctac cacctgcctg tctcattgca ttgtgctttt
180
gaaaattatg acaataacaa ccaatgagaa aaaatatgat cctcctgcaa tgaatccact
240
ggagggggta cggagcttgg aatgctccta agattccgac ctaatcagcg tcgagcccga
300
tcagtagctg cagcactcgg cctcagtgca ttgttaggaa cagggactgt cctgggtccg
360
cctgacgggg agacacttcg agaaggggct gaagatgccg gggcagaacg gttgtgcgcc
420
atgtgcgcct tgaccaggtg accggcggct agggcagcac atagcgagag ctccccagcc
480
aaaacagcgc ttccgatgat gcgcgcaagt tgacgtgcat tctcaecggg agtggtcggg
540

tgtgatccgc ggacaccaag catgtcaagc attgcgccct ggggctccag aatcgtagca
600

ccgcccacacg ttccaacctc aatagacggc atggagacag agatttgaag cgatccgcga
660

agattgttca tgagagtgat gcagtttagc ctctccacaa cttgcgccgg atcctgacct
720

gtggcaatga aaatggctgc cgcaagattg gcagcttggg cgttg
765

<210> 33

<211> 802

<212> DNA

<213> *Penicillium citrinum*

<400> 33

aactggaaga attcgcggcc gcaggaattt tttttttttt tttttataga atctttgaaa
60

tcgacattaa ttaagtatgt ggagattctt tgtggaggca cggtaatgtg tctatctagc
120

aacgcggtca agcatcagtc tcaggcacag cccgggtgtc gtttttggtt gcaatcttcc
180

gccatcccat tccaaaggca aacacaaacg tgcacgccgt agctcccact gctaagtaaa
240

aagtatgatc aacggcgaga ctgtaagctt ttacaacccc tggaagggtta ttcttgctga
300

ccacatctct gaagccagtc gccctgctg ccgtcacggc ctgcgtgtcg acagtgggag
360

catacttgct caggccagtt ctcaaaccgg acccaaagac aaggtttagca aagtccagga
420

agagcgatcc tccaaacgtc tgtccaaaca cggcgagaga aattccgagg gcaccttggt
480

cgggcgaaag cgtgcttttg atggcgatga taggcgtttg catgccacaa ccacgaccga
540

agcccgcgat aaattggtac atgacccatt tcacagttga tgtatggggc tggaaggtgg
600

ataccagacc tgcgccctatg gcgacgagaa cagcgctgcc tagggcccaa ggcaaatagt
660

atcctgtctt tccaattgcg aagccagaaa ccatagccat aatgacttgt ccaagaattc
720

caggcaacat gtacacacca ctcaagtgtg gagaaacatc cttcacagcc tggaagtaga
780

tcggtagata gtaggaaaag ac
802

<210> 34

<211> 562

<212> DNA

<213> *Penicillium citrinum*

<400> 34

aactggaaga attcgcggcc gcaggaattt tttttttttt ttttttttac taagcaatat
60

tgtgtttctt cgctaattgcg aatatttcct tatagcaacg tcgcaacaca tttatcgtct
120

tcctgaggc ctttgttgac ttgggctctt cgtctccggc ttcgtcactc caaagcacag
180

ataggagacg agaggccggc gttatggttt tattttcagc gccaaaggatt tgccacgatg
240

tgcttgatc atctgatagg actagacgaa tagatgccgc agccccgtgc tcctgtgcta
300

tcccaaagc agtctcaatc ccaactcaata gtcgaaggct tacacgcaat gtcgtgcatg
360

cagaagataa ggcgtgcatg aatgggtcga gatgtgaaat gagctcgccg atatgaagat
420

tagagtgaat cgagggaagt gcttcggctc ttccattgtc atttctagtg gttgagccag
480

accagtagca atccattcgt gtgctttgct tttgtccaca aggttgggct ttcattcacct
540

cggatagtag cagctgggaa ag
562

<210> 35

<211> 26

<212> DNA

<213> *Penicillium citrinum*

<400> 35
gttaacatgt cagaacctct accccc
26

<210> 36

<211> 27

<212> DNA

<213> *Penicillium citrinum*

<400> 36
aatatttcaa gcatcagtct caggcac
27

<210> 37

<211> 1662

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(1662)

<400> 37

atg tca gaa cct cta ccc cct aaa gaa ggg gaa cca agg cca cag aag

48

Met Ser Glu Pro Leu Pro Pro Lys Glu Gly Glu Pro Arg Pro Gln Lys

1

5

10

15

gaa gaa agt caa aat gac acg ctc gaa gcg act gag tcc aag tcc cag

96

Glu Glu Ser Gln Asn Asp Thr Leu Glu Ala Thr Glu Ser Lys Ser Gln

20

25

30

cac atc aca ggc ctc aag ctc ggg ctg gtg gtt gct tca gtt act ttc

144

His Ile Thr Gly Leu Lys Leu Gly Leu Val Val Ala Ser Val Thr Phe

35

40

45

gta gca ttt ttg atg ctc ctt gat atg tcc att atc gtc acg gca atc

192

Val Ala Phe Leu Met Leu Leu Asp Met Ser Ile Ile Val Thr Ala Ile

50

55

60

cca cat atc aca agc gag ttc cac tct ctg aac gat gta ggg tgg tac

240

Pro His Ile Thr Ser Glu Phe His Ser Leu Asn Asp Val Gly Trp Tyr

65

70

75

80

ggc agt gct tat ctt ctg gct aac tgt gct ctc cag ccc ctg gcc ggt

288

Gly Ser Ala Tyr Leu Leu Ala Asn Cys Ala Leu Gln Pro Leu Ala Gly

85

90

95

aaa ttg tat aca ctc ttg ggc ttg aag tac act ttc ttt gcc ttc ctc

336

Lys Leu Tyr Thr Leu Leu Gly Leu Lys Tyr Thr Phe Phe Ala Phe Leu

100	105	110
tgt att ttt gaa cta ggc tcg gtg cta tgc ggt gcc gca aga tct tcc		
384		
Cys Ile Phe Glu Leu Gly Ser Val Leu Cys Gly Ala Ala Arg Ser Ser		
115	120	125
acc atg ttg att gtt ggg cgg gcc gtt gct gga atg gga ggc tca ggt		
432		
Thr Met Leu Ile Val Gly Arg Ala Val Ala Gly Met Gly Gly Ser Gly		
130	135	140
ctt gtc aac gga gcc ctc aca atc ctc tca aca gct gct cct aag cac		
480		
Leu Val Asn Gly Ala Leu Thr Ile Leu Ser Thr Ala Ala Pro Lys His		
145	150	155
aag caa cca gtt ttg att gga gtg atg atg ggt ctt agt cag att gcc		
528		
Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala		
165	170	175
att gtc tgt gga cca ctg ctc gga ggt gct ttc act caa cac gcc act		
576		
Ile Val Cys Gly Pro Leu Leu Gly Gly Ala Phe Thr Gln His Ala Thr		
180	185	190
tgg cga tgg tgc ttt tat atc aat ctc ccc atc ggc gct gtc gct gca		
624		
Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala		
195	200	205
ttc ctc ctt ctc gtc atc acc ata ccc gac cga att tca tcc acg gac		
672		
Phe Leu Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp		

210	215	220	
agc gaa ctc tcg acc gac aaa cca atg gcc aac ata aaa tcc aca ctt			
720			
Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu			
225	230	235	240
cgc aaa ctg gac ctt gta ggc ttt gtg gtc ttt gca gcc ttc gca acc			
768			
Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr			
245	250	255	
atg att tcc ctc gca cta gaa tgg gga ggg tcg acc tac acc tgg cga			
816			
Met Ile Ser Leu Ala Leu Glu Trp Gly Gly Ser Thr Tyr Thr Trp Arg			
260	265	270	
agt tcc gtc atc atc ggc ctg ttc tgt ggc gga ggg ttt gct ctg att			
864			
Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Gly Phe Ala Leu Ile			
275	280	285	
gcg ttc gtg cta tgg gag cgt cat gtt ggc gat gct gtt gcc atg att			
912			
Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile			
290	295	300	
cct ggc tca gtg gct ggt aaa cga caa gtg tgg tgc tct tgt tta ttt			
960			
Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe			
305	310	315	320
atg ggc ttt ttc tct ggc tcc ttg ctt gtc ttt tcc tac tat cta ccg			
1008			
Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro			
325	330	335	

atc tac ttc cag gct gtg aag gat gtt tct ccc aca ctg agt ggt gtg
1056

Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val

340

345

350

tac atg ttg cct gga att ctt gga caa gtc att atg gct atg gtt tct
1104

Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser

355

360

365

ggc ttc gca att gga aag aca gga tac tat ttg cct tgg gcc cta ggc
1152

Gly Phe Ala Ile Gly Lys Thr Gly Tyr Tyr Leu Pro Trp Ala Leu Gly

370

375

380

agc gct gtt ctc gtc gcc ata ggc gca ggt ctg gta tcc acc ttc cag
1200

Ser Ala Val Leu Val Ala Ile Gly Ala Gly Leu Val Ser Thr Phe Gln

385

390

395

400

ccc cat aca tca act gtg aaa tgg gtc atg tac caa ttt atc gcg ggc
1248

Pro His Thr Ser Thr Val Lys Trp Val Met Tyr Gln Phe Ile Ala Gly

405

410

415

ttc ggt cgt ggt tgt ggc atg caa acg cct atc atc gcc atc caa agc
1296

Phe Gly Arg Gly Cys Gly Met Gln Thr Pro Ile Ile Ala Ile Gln Ser

420

425

430

acg ctt tcg ccc gaa caa ggt gcc ctc gga att tct ctc gcc gtg ttt
1344

Thr Leu Ser Pro Glu Gln Gly Ala Leu Gly Ile Ser Leu Ala Val Phe

435

440

445

gga cag acg ttt gga gga tcg ctc ttc ctg gac ttt gct aac ctt gtc
1392

Gly Gln Thr Phe Gly Gly Ser Leu Phe Leu Asp Phe Ala Asn Leu Val

450

455

460

ttt ggg tcc ggt ttg aga act ggc ctg agc aag tat gcg ccc act gtc
1440

Phe Gly Ser Gly Leu Arg Thr Gly Leu Ser Lys Tyr Ala Pro Thr Val

465

470

475

480

gac acg cag gcc gtg acg gca gca ggg gcg act ggc ttc aga gat gtg
1488

Asp Thr Gln Ala Val Thr Ala Ala Gly Ala Thr Gly Phe Arg Asp Val

485

490

495

gtc agc aag aat aac ctt cca ggg gtt gta aaa gct tac agt ctc gcc
1536

Val Ser Lys Asn Asn Leu Pro Gly Val Val Lys Ala Tyr Ser Leu Ala

500

505

510

gtt gat cat act ttt tac tta gca gtg gga gct acg gcg tgc acg ttt
1584

Val Asp His Thr Phe Tyr Leu Ala Val Gly Ala Thr Ala Cys Thr Phe

515

520

525

gtg ttt gcc ttt gga atg gga tgg cgg aag att gca acc aaa aac gac
1632

Val Phe Ala Phe Gly Met Gly Trp Arg Lys Ile Ala Thr Lys Asn Asp

530

535

540

acc cgg gct gtg cct gag act gat gct tga
1662

Thr Arg Ala Val Pro Glu Thr Asp Ala

545

550

<210> 38

<211> 553

<212> PRT

<213> Penicillium citrinum

<400> 38

Met Ser Glu Pro Leu Pro Pro Lys Glu Gly Glu Pro Arg Pro Gln Lys
1 5 10 15

Glu Glu Ser Gln Asn Asp Thr Leu Glu Ala Thr Glu Ser Lys Ser Gln
20 25 30

His Ile Thr Gly Leu Lys Leu Gly Leu Val Val Ala Ser Val Thr Phe
35 40 45

Val Ala Phe Leu Met Leu Leu Asp Met Ser Ile Ile Val Thr Ala Ile
50 55 60

Pro His Ile Thr Ser Glu Phe His Ser Leu Asn Asp Val Gly Trp Tyr
65 70 75 80

Gly Ser Ala Tyr Leu Leu Ala Asn Cys Ala Leu Gln Pro Leu Ala Gly
85 90 95

Lys Leu Tyr Thr Leu Leu Gly Leu Lys Tyr Thr Phe Phe Ala Phe Leu
100 105 110

Cys Ile Phe Glu Leu Gly Ser Val Leu Cys Gly Ala Ala Arg Ser Ser
115 120 125

Thr Met Leu Ile Val Gly Arg Ala Val Ala Gly Met Gly Gly Ser Gly
130 135 140

Leu Val Asn Gly Ala Leu Thr Ile Leu Ser Thr Ala Ala Pro Lys His
145 150 155 160

Lys Gln Pro Val Leu Ile Gly Val Met Met Gly Leu Ser Gln Ile Ala
 165 170 175

Ile Val Cys Gly Pro Leu Leu Gly Gly Ala Phe Thr Gln His Ala Thr
 180 185 190

Trp Arg Trp Cys Phe Tyr Ile Asn Leu Pro Ile Gly Ala Val Ala Ala
 195 200 205

Phe Leu Leu Leu Val Ile Thr Ile Pro Asp Arg Ile Ser Ser Thr Asp
 210 215 220

Ser Glu Leu Ser Thr Asp Lys Pro Met Ala Asn Ile Lys Ser Thr Leu
 225 230 235 240

Arg Lys Leu Asp Leu Val Gly Phe Val Val Phe Ala Ala Phe Ala Thr
 245 250 255

Met Ile Ser Leu Ala Leu Glu Trp Gly Gly Ser Thr Tyr Thr Trp Arg
 260 265 270

Ser Ser Val Ile Ile Gly Leu Phe Cys Gly Gly Gly Phe Ala Leu Ile
 275 280 285

Ala Phe Val Leu Trp Glu Arg His Val Gly Asp Ala Val Ala Met Ile
 290 295 300

Pro Gly Ser Val Ala Gly Lys Arg Gln Val Trp Cys Ser Cys Leu Phe
 305 310 315 320

Met Gly Phe Phe Ser Gly Ser Leu Leu Val Phe Ser Tyr Tyr Leu Pro
 325 330 335

Ile Tyr Phe Gln Ala Val Lys Asp Val Ser Pro Thr Leu Ser Gly Val
 340 345 350

Tyr Met Leu Pro Gly Ile Leu Gly Gln Val Ile Met Ala Met Val Ser

355					360					365					
Gly	Phe	Ala	Ile	Gly	Lys	Thr	Gly	Tyr	Tyr	Leu	Pro	Trp	Ala	Leu	Gly
370						375					380				
Ser	Ala	Val	Leu	Val	Ala	Ile	Gly	Ala	Gly	Leu	Val	Ser	Thr	Phe	Gln
385					390					395					400
Pro	His	Thr	Ser	Thr	Val	Lys	Trp	Val	Met	Tyr	Gln	Phe	Ile	Ala	Gly
				405					410					415	
Phe	Gly	Arg	Gly	Cys	Gly	Met	Gln	Thr	Pro	Ile	Ile	Ala	Ile	Gln	Ser
			420					425					430		
Thr	Leu	Ser	Pro	Glu	Gln	Gly	Ala	Leu	Gly	Ile	Ser	Leu	Ala	Val	Phe
		435					440					445			
Gly	Gln	Thr	Phe	Gly	Gly	Ser	Leu	Phe	Leu	Asp	Phe	Ala	Asn	Leu	Val
450						455					460				
Phe	Gly	Ser	Gly	Leu	Arg	Thr	Gly	Leu	Ser	Lys	Tyr	Ala	Pro	Thr	Val
465					470					475					480
Asp	Thr	Gln	Ala	Val	Thr	Ala	Ala	Gly	Ala	Thr	Gly	Phe	Arg	Asp	Val
				485					490					495	
Val	Ser	Lys	Asn	Asn	Leu	Pro	Gly	Val	Val	Lys	Ala	Tyr	Ser	Leu	Ala
			500					505					510		
Val	Asp	His	Thr	Phe	Tyr	Leu	Ala	Val	Gly	Ala	Thr	Ala	Cys	Thr	Phe
		515					520					525			
Val	Phe	Ala	Phe	Gly	Met	Gly	Trp	Arg	Lys	Ile	Ala	Thr	Lys	Asn	Asp
	530					535					540				
Thr	Arg	Ala	Val	Pro	Glu	Thr	Asp	Ala							
545					550										

<210> 39

<211> 31

<212> DNA

<213> *Penicillium citrinum*

<400> 39

ggatccatgt ccctgccgca tgcaacgatt c
31

<210> 40

<211> 30

<212> DNA

<213> *Penicillium citrinum*

<400> 40

ggatccctaa gcaatattgt gtttcttcgc
30

<210> 41

<211> 1380

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(1380)

<400> 41

atg tcc ctg ccg cat gca acg att ccg acg aac cta cgc cgt cgc gcg

48
 Met Ser Leu Pro His Ala Thr Ile Pro Thr Asn Leu Arg Arg Arg Ala
 1 5 10 15
 ttt cga cgc tca tgt gac cgg tgt cat gca caa aag ctc aaa tgt acc
 96
 Phe Arg Arg Ser Cys Asp Arg Cys His Ala Gln Lys Leu Lys Cys Thr
 20 25 30
 ggt agc aat gcc aat tta gtc cgt gct cag tgt caa cgt tgt caa caa
 144
 Gly Ser Asn Ala Asn Leu Val Arg Ala Gln Cys Gln Arg Cys Gln Gln
 35 40 45
 gcc gga tta agg tgt gtg tac agc gaa agg cta ccc aag cgc aat tta
 192
 Ala Gly Leu Arg Cys Val Tyr Ser Glu Arg Leu Pro Lys Arg Asn Leu
 50 55 60
 cat aaa gaa gcc gca gct gga act aca aga gcc aca gaa acc tca caa
 240
 His Lys Glu Ala Ala Ala Gly Thr Thr Arg Ala Thr Glu Thr Ser Gln
 65 70 75 80
 ccg atg acc gcg aca tct tct acg gtc ttc tca tca ttg gca gag act
 288
 Pro Met Thr Ala Thr Ser Ser Thr Val Phe Ser Ser Leu Ala Glu Thr
 85 90 95
 cct cca cct tac tgc tca cca cct acg cat att ggc acc tcg gca ctc
 336
 Pro Pro Pro Tyr Cys Ser Pro Pro Thr His Ile Gly Thr Ser Ala Leu
 100 105 110
 aag gaa aca tta tca gaa cca tca gcg gca acc ctg caa ttc tat gat
 384

Lys Glu Thr Leu Ser Glu Pro Ser Ala Ala Thr Leu Gln Phe Tyr Asp

115

120

125

aca tca atc aac ttt gat gat ccc gag tcg ttt ccc ggc ggc tgg cct
432

Thr Ser Ile Asn Phe Asp Asp Pro Glu Ser Phe Pro Gly Gly Trp Pro

130

135

140

cag cca aat aca ttt cgc gac gat gcc aac agc aat gaa tct tcg ggg
480

Gln Pro Asn Thr Phe Arg Asp Asp Ala Asn Ser Asn Glu Ser Ser Gly

145

150

155

160

ata cca gat cta ggc tac gac ttt gaa ggc cct ttg gat gca acg gcg
528

Ile Pro Asp Leu Gly Tyr Asp Phe Glu Gly Pro Leu Asp Ala Thr Ala

165

170

175

cct gtc tcg cca tcg ctg ttt gac ctc gaa gta gag ggg aac tcg tca
576

Pro Val Ser Pro Ser Leu Phe Asp Leu Glu Val Glu Gly Asn Ser Ser

180

185

190

tcc gga caa tcc aac aca agc aac acg caa cga gac ctt ttc gaa agt
624

Ser Gly Gln Ser Asn Thr Ser Asn Thr Gln Arg Asp Leu Phe Glu Ser

195

200

205

ctg tcg gat gtg tca cag gac cta gag gta ata ctc cac ggg gtg act
672

Leu Ser Asp Val Ser Gln Asp Leu Glu Val Ile Leu His Gly Val Thr

210

215

220

gtg gaa tgg ccc aag caa aaa att tta agc tac ccg ata ggg gac ttt
720

Val Glu Trp Pro Lys Gln Lys Ile Leu Ser Tyr Pro Ile Gly Asp Phe

225	230	235	240
ttg aat gcc ttt ggt aga ttg cta cta cat ctt caa gaa cgt gtg atc 768 Leu Asn Ala Phe Gly Arg Leu Leu Leu His Leu Gln Glu Arg Val Ile			
245	250	255	
acg agc agc aat agc agc atg tta gat ggg tgt ctg caa acc aag aac 816 Thr Ser Ser Asn Ser Ser Met Leu Asp Gly Cys Leu Gln Thr Lys Asn			
260	265	270	
ttg ttc atg gcg gtg cat tgc tac atg ttg tct gtc aaa atc atg aca 864 Leu Phe Met Ala Val His Cys Tyr Met Leu Ser Val Lys Ile Met Thr			
275	280	285	
tca ctt tcc cag ctg cta cta tcc gag gtg atg aaa gcc caa cct tgt 912 Ser Leu Ser Gln Leu Leu Leu Ser Glu Val Met Lys Ala Gln Pro Cys			
290	295	300	
gga caa aag caa agc aca cga atg gat tgg tac tgg tct ggc tca acc 960 Gly Gln Lys Gln Ser Thr Arg Met Asp Trp Tyr Trp Ser Gly Ser Thr			
305	310	315	320
act aga aat gac aat gga aga gcc gaa gca ctt ccc tcg ttt cac tct 1008 Thr Arg Asn Asp Asn Gly Arg Ala Glu Ala Leu Pro Ser Phe His Ser			
325	330	335	
aat ctt cat atc ggc gag ctc att tca cat ctc gac cca ttc atg cac 1056 Asn Leu His Ile Gly Glu Leu Ile Ser His Leu Asp Pro Phe Met His			

340	345	350
gcc tta tct tct gca tgc acg aca ttg cgt gta agc ctt cga cta ttg		
1104		
Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu		
355	360	365
agt gag att gag act gct ttg ggg ata gca cag gag cac ggg gct gcg		
1152		
Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala		
370	375	380
gca tct att cgt cta gtc cta tca gat atg cca agc aca tcg tgg caa		
1200		
Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln		
385	390	395
atc ctt ggc gct gaa aat aaa acc ata acg ccg gcc tct cgt ctc cta		
1248		
Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu		
405	410	415
tct gtg ctt tgg agt gac gaa gcc gga gac gaa gag ccc aag tca aca		
1296		
Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr		
420	425	430
aag gcc tca ggg aag acg ata aat gtg ttg cga cgt tgc tat aag gaa		
1344		
Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu		
435	440	445
ata ttc gca tta gcg aag aaa cac aat att gct tag		
1380		
Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala		
450	455	

<210> 42

<211> 459

<212> PRT

<213> Penicillium citrinum

<400> 42

Met Ser Leu Pro His Ala Thr Ile Pro Thr Asn Leu Arg Arg Arg Ala
1 5 10 15

Phe Arg Arg Ser Cys Asp Arg Cys His Ala Gln Lys Leu Lys Cys Thr
20 25 30

Gly Ser Asn Ala Asn Leu Val Arg Ala Gln Cys Gln Arg Cys Gln Gln
35 40 45

Ala Gly Leu Arg Cys Val Tyr Ser Glu Arg Leu Pro Lys Arg Asn Leu
50 55 60

His Lys Glu Ala Ala Ala Gly Thr Thr Arg Ala Thr Glu Thr Ser Gln
65 70 75 80

Pro Met Thr Ala Thr Ser Ser Thr Val Phe Ser Ser Leu Ala Glu Thr
85 90 95

Pro Pro Pro Tyr Cys Ser Pro Pro Thr His Ile Gly Thr Ser Ala Leu
100 105 110

Lys Glu Thr Leu Ser Glu Pro Ser Ala Ala Thr Leu Gln Phe Tyr Asp
115 120 125

Thr Ser Ile Asn Phe Asp Asp Pro Glu Ser Phe Pro Gly Gly Trp Pro
130 135 140

Gln Pro Asn Thr Phe Arg Asp Asp Ala Asn Ser Asn Glu Ser Ser Gly
145 150 155 160

Ile Pro Asp Leu Gly Tyr Asp Phe Glu Gly Pro Leu Asp Ala Thr Ala
165 170 175

Pro Val Ser Pro Ser Leu Phe Asp Leu Glu Val Glu Gly Asn Ser Ser
180 185 190

Ser Gly Gln Ser Asn Thr Ser Asn Thr Gln Arg Asp Leu Phe Glu Ser
195 200 205

Leu Ser Asp Val Ser Gln Asp Leu Glu Val Ile Leu His Gly Val Thr
210 215 220

Val Glu Trp Pro Lys Gln Lys Ile Leu Ser Tyr Pro Ile Gly Asp Phe
225 230 235 240

Leu Asn Ala Phe Gly Arg Leu Leu Leu His Leu Gln Glu Arg Val Ile
245 250 255

Thr Ser Ser Asn Ser Ser Met Leu Asp Gly Cys Leu Gln Thr Lys Asn
260 265 270

Leu Phe Met Ala Val His Cys Tyr Met Leu Ser Val Lys Ile Met Thr
275 280 285

Ser Leu Ser Gln Leu Leu Leu Ser Glu Val Met Lys Ala Gln Pro Cys
290 295 300

Gly Gln Lys Gln Ser Thr Arg Met Asp Trp Tyr Trp Ser Gly Ser Thr
305 310 315 320

Thr Arg Asn Asp Asn Gly Arg Ala Glu Ala Leu Pro Ser Phe His Ser
325 330 335

Asn Leu His Ile Gly Glu Leu Ile Ser His Leu Asp Pro Phe Met His
340 345 350

Ala Leu Ser Ser Ala Cys Thr Thr Leu Arg Val Ser Leu Arg Leu Leu
355 360 365

Ser Glu Ile Glu Thr Ala Leu Gly Ile Ala Gln Glu His Gly Ala Ala
370 375 380

Ala Ser Ile Arg Leu Val Leu Ser Asp Met Pro Ser Thr Ser Trp Gln
385 390 395 400

Ile Leu Gly Ala Glu Asn Lys Thr Ile Thr Pro Ala Ser Arg Leu Leu
405 410 415

Ser Val Leu Trp Ser Asp Glu Ala Gly Asp Glu Glu Pro Lys Ser Thr
420 425 430

Lys Ala Ser Gly Lys Thr Ile Asn Val Leu Arg Arg Cys Tyr Lys Glu
435 440 445

Ile Phe Ala Leu Ala Lys Lys His Asn Ile Ala
450 455

<210> 43

<211> 9099

<212> DNA

<213> *Penicillium citrinum*

<220>

<221> CDS

<222> (1)..(9099)

<400> 43

atg gat caa gcc aac tat cca aac gag cca att gtg gta gtg gga agc
48

Met Asp Gln Ala Asn Tyr Pro Asn Glu Pro Ile Val Val Val Gly Ser
1 5 10 15

ggt tgt cgg ttt cca ggt ggt gtc aac aca cca tca aaa ctt tgg gag
96
Gly Cys Arg Phe Pro Gly Gly Val Asn Thr Pro Ser Lys Leu Trp Glu
20 25 30

ctg ctc aaa gag ccc cgg gat gta cag acc aag atc cct aag gag aga
144
Leu Leu Lys Glu Pro Arg Asp Val Gln Thr Lys Ile Pro Lys Glu Arg
35 40 45

ttt gac gtc gat aca ttt tac agc ccc gat ggc act cac ccc ggg cgc
192
Phe Asp Val Asp Thr Phe Tyr Ser Pro Asp Gly Thr His Pro Gly Arg
50 55 60

acg aac gca ccc ttt gca tac ttg ctg cag gag gat cta cgc ggt ttt
240
Thr Asn Ala Pro Phe Ala Tyr Leu Leu Gln Glu Asp Leu Arg Gly Phe
65 70 75 80

gat gcc tct ttc ttc aac atc caa gct gga gag gcc gaa acg att gac
288
Asp Ala Ser Phe Phe Asn Ile Gln Ala Gly Glu Ala Glu Thr Ile Asp
85 90 95

cca cag caa agg ctg ctg ctg gag acg gtc tat gaa gct gta tcc aac
336
Pro Gln Gln Arg Leu Leu Leu Glu Thr Val Tyr Glu Ala Val Ser Asn
100 105 110

gca ggc cta cgg atc caa ggc ctt caa gga tcc tct act gct gtg tac
384
Ala Gly Leu Arg Ile Gln Gly Leu Gln Gly Ser Ser Thr Ala Val Tyr

115	120	125	
gtc ggt atg atg acg cat gac tat gag act atc gtg acg cgt gaa ttg 432 Val Gly Met Met Thr His Asp Tyr Glu Thr Ile Val Thr Arg Glu Leu			
130	135	140	
gat agt att cct aca tac tct gcc acg ggg gta gct gtc agt gtg gcc 480 Asp Ser Ile Pro Thr Tyr Ser Ala Thr Gly Val Ala Val Ser Val Ala			
145	150	155	160
tcc aac cgt gta tca tac ttc ttc gac tgg cat ggg ccg agt atg acg 528 Ser Asn Arg Val Ser Tyr Phe Phe Asp Trp His Gly Pro Ser Met Thr			
165		170	175
atc gac aca gcc tgt agt tca tcc tta gct gcc gtg cat ctg gcc gtc 576 Ile Asp Thr Ala Cys Ser Ser Ser Leu Ala Ala Val His Leu Ala Val			
180		185	190
caa cag ctt aga acg ggc gag agt acc atg gcg gtt gca gcc ggt gcg 624 Gln Gln Leu Arg Thr Gly Glu Ser Thr Met Ala Val Ala Ala Gly Ala			
195	200	205	
aat ctg ata ttg ggc ccc atg acc ttt gta atg gag agc aaa ttg aac 672 Asn Leu Ile Leu Gly Pro Met Thr Phe Val Met Glu Ser Lys Leu Asn			
210	215	220	
atg ctg tcc ccc aat ggt aga tct cga atg tgg gat gct gct gcc gat 720 Met Leu Ser Pro Asn Gly Arg Ser Arg Met Trp Asp Ala Ala Ala Asp			

225	230	235	240
gga tat gcc aga gga gaa ggt gtt tgc tct att gtc ctg aaa acg ctg			
768			
Gly Tyr Ala Arg Gly Glu Gly Val Cys Ser Ile Val Leu Lys Thr Leu			
245	250	255	
agc cag gca ctg cgc gac ggg gac agt atc gag tgt gtt atc cga gag			
816			
Ser Gln Ala Leu Arg Asp Gly Asp Ser Ile Glu Cys Val Ile Arg Glu			
260	265	270	
acc ggt atc aac caa gat ggc cga acg aca ggt atc aca atg cca aac			
864			
Thr Gly Ile Asn Gln Asp Gly Arg Thr Thr Gly Ile Thr Met Pro Asn			
275	280	285	
cat agc gca caa gaa gcc ctc att cgg gcc aca tat gcc aag gct ggt			
912			
His Ser Ala Gln Glu Ala Leu Ile Arg Ala Thr Tyr Ala Lys Ala Gly			
290	295	300	
ctt gat att acc aac ccc cag gaa cgc tgc cag ttc ttt gaa gcc cat			
960			
Leu Asp Ile Thr Asn Pro Gln Glu Arg Cys Gln Phe Phe Glu Ala His			
305	310	315	320
gga act ggt aca cca gcc ggt gac cca cag gaa gct gag gct att gca			
1008			
Gly Thr Gly Thr Pro Ala Gly Asp Pro Gln Glu Ala Glu Ala Ile Ala			
325	330	335	
aca gcc ttc ttc gga cac aag gat gga aca atc gac agc gac ggc gag			
1056			
Thr Ala Phe Phe Gly His Lys Asp Gly Thr Ile Asp Ser Asp Gly Glu			
340	345	350	

aaa gat gag ctt ttt gtc ggc agc atc aag aca gtt ctc ggt cac acg
1104

Lys Asp Glu Leu Phe Val Gly Ser Ile Lys Thr Val Leu Gly His Thr

355

360

365

gaa ggc act gct ggt att gcg ggc tta atg aag gca tcg ttt gct gta
1152

Glu Gly Thr Ala Gly Ile Ala Gly Leu Met Lys Ala Ser Phe Ala Val

370

375

380

cga aat ggc gtg atc ccg cca aac ctg ctg ttt gag aag atc agt ccc
1200

Arg Asn Gly Val Ile Pro Pro Asn Leu Leu Phe Glu Lys Ile Ser Pro

385

390

395

400

cgt gtc gct ccg ttc tat acg cac ttg aaa att gca acg gag gcc aca
1248

Arg Val Ala Pro Phe Tyr Thr His Leu Lys Ile Ala Thr Glu Ala Thr

405

410

415

gaa tgg ccg att gtt gcg ccc ggg cag cct cgc aga gtc agc gtt aat
1296

Glu Trp Pro Ile Val Ala Pro Gly Gln Pro Arg Arg Val Ser Val Asn

420

425

430

tca ttt gga ttt ggt ggt aca aat gcc cat gct att atc gaa gag tat
1344

Ser Phe Gly Phe Gly Gly Thr Asn Ala His Ala Ile Ile Glu Glu Tyr

435

440

445

atg gct cct cca cac aag ccg aca gca gtg gta aca gag gtg acc tca
1392

Met Ala Pro Pro His Lys Pro Thr Ala Val Val Thr Glu Val Thr Ser

450

455

460

gat gca gat gca tgc agc ttg ccc ctt gtg ctt tca tcg aag tcg cag
1440

Asp Ala Asp Ala Cys Ser Leu Pro Leu Val Leu Ser Ser Lys Ser Gln

465

470

475

480

cgc tcc atg aag gca acg cta gaa aat atg ctc caa ttt ctg gaa acg
1488

Arg Ser Met Lys Ala Thr Leu Glu Asn Met Leu Gln Phe Leu Glu Thr

485

490

495

cat gat gac gtg gac atg cat gat atc gca tat acc tta ctt gag aaa
1536

His Asp Asp Val Asp Met His Asp Ile Ala Tyr Thr Leu Leu Glu Lys

500

505

510

cgg tct atc ttg ccc ttc cgt cgt gcg att gca gca cac aac aag gaa
1584

Arg Ser Ile Leu Pro Phe Arg Arg Ala Ile Ala Ala His Asn Lys Glu

515

520

525

gta gcc cgc gcg gca ctg gag gct gcc atc gcg gac ggt gag gtc gtc
1632

Val Ala Arg Ala Ala Leu Glu Ala Ala Ile Ala Asp Gly Glu Val Val

530

535

540

acc gac ttc cgc acc gac gcg aat gac aac cct cgc gta cta ggt gtc
1680

Thr Asp Phe Arg Thr Asp Ala Asn Asp Asn Pro Arg Val Leu Gly Val

545

550

555

560

ttt act ggc caa ggt gca cag tgg ccg ggc atg ctg aag aag ctc atg
1728

Phe Thr Gly Gln Gly Ala Gln Trp Pro Gly Met Leu Lys Lys Leu Met

565

570

575

gtg ggt atg cca ttt gtg aga ggc att ctc gaa gag ctg gat aat tca

1776
 Val Gly Met Pro Phe Val Arg Gly Ile Leu Glu Glu Leu Asp Asn Ser
 580 585 590

 ctg caa aca ctg cct gaa aag tat cgg cct acg tgg aca ctg tat gac
 1824
 Leu Gln Thr Leu Pro Glu Lys Tyr Arg Pro Thr Trp Thr Leu Tyr Asp
 595 600 605

 cag ctc atg ctt gaa ggg gat gcc tca aac gtc aga ctc gcc agc ttc
 1872
 Gln Leu Met Leu Glu Gly Asp Ala Ser Asn Val Arg Leu Ala Ser Phe
 610 615 620

 tcc cag cct cta tgc tgc gcc gta caa atc gtt ctg gtc cga ctt ctc
 1920
 Ser Gln Pro Leu Cys Cys Ala Val Gln Ile Val Leu Val Arg Leu Leu
 625 630 635 640

 gct gca gct ggt atc gag ttc agt gca att gtc ggc cac agt tca ggt
 1968
 Ala Ala Ala Gly Ile Glu Phe Ser Ala Ile Val Gly His Ser Ser Gly
 645 650 655

 gag att gcc tgt gcc ttt gcg gca gga ttc atc agt gcc act caa gct
 2016
 Glu Ile Ala Cys Ala Phe Ala Ala Gly Phe Ile Ser Ala Thr Gln Ala
 660 665 670

 atc cgt att gcg cat ctg cgt gga gtt gtg tcc gcg gag cat gcc tct
 2064
 Ile Arg Ile Ala His Leu Arg Gly Val Val Ser Ala Glu His Ala Ser
 675 680 685

 tct cca agc ggc cag aca ggc gct atg cta gcg gca ggt atg tcg tac
 2112

Ser Pro Ser Gly Gln Thr Gly Ala Met Leu Ala Ala Gly Met Ser Tyr
690 695 700

gat gac gca aag gaa cta tgc gag ctc gaa gcc ttt gag ggt cgg gtc
2160
Asp Asp Ala Lys Glu Leu Cys Glu Leu Glu Ala Phe Glu Gly Arg Val
705 710 715 720

tgc gtc gcc gct agc aat tca ccg gat agt gtg acc ttc tcc ggc gac
2208
Cys Val Ala Ala Ser Asn Ser Pro Asp Ser Val Thr Phe Ser Gly Asp
725 730 735

atg gat gct atc cag cac gtt gaa ggt gtc ttg gag gat gaa tcc act
2256
Met Asp Ala Ile Gln His Val Glu Gly Val Leu Glu Asp Glu Ser Thr
740 745 750

ttt gcc aga atc ttg aga gtt gac aag gcc tac cat tcg cat cac atg
2304
Phe Ala Arg Ile Leu Arg Val Asp Lys Ala Tyr His Ser His His Met
755 760 765

cac cca tgc gca gct cca tat gtc aag gca ttg ctg gag tgc gac tgt
2352
His Pro Cys Ala Ala Pro Tyr Val Lys Ala Leu Leu Glu Cys Asp Cys
770 775 780

gct gtt gcc gat ggc caa ggt aac gat agt gtt gct tgg ttc tct gcc
2400
Ala Val Ala Asp Gly Gln Gly Asn Asp Ser Val Ala Trp Phe Ser Ala
785 790 795 800

gtc cac gag acc agc aag caa atg act gta cag gat gtg atg ccc gct
2448
Val His Glu Thr Ser Lys Gln Met Thr Val Gln Asp Val Met Pro Ala

805	810	815
tat tgg aaa gac aat ctc gtc tct ccg gtc ttg ttc tcg cag gct gtg		
2496		
Tyr Trp Lys Asp Asn Leu Val Ser Pro Val Leu Phe Ser Gln Ala Val		
820	825	830
cag aaa gca gtc atc act cat cgt cta atc gac gtc gcc atc gaa att		
2544		
Gln Lys Ala Val Ile Thr His Arg Leu Ile Asp Val Ala Ile Glu Ile		
835	840	845
ggc gcc cac cct gct ctc aag ggt ccg tgt cta gcc acc atc aag gat		
2592		
Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp		
850	855	860
gct ctt gcc ggt gtg gag ctg ccg tat acc ggg tgc ttg gca cga aac		
2640		
Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn		
865	870	875
gtt gac gat gtg gac gct ttt gct gga ggt ctg gga tac att tgg gag		
2688		
Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu		
885	890	895
cgt ttc gga gtt cgg agt atc gac gcc gag ggc ttc gta caa caa gtc		
2736		
Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val		
900	905	910
cgg ccc gat cgt gcc gtt caa aac ctg tca aag tca ttg ccc aca tac		
2784		
Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr		

915	920	925
tct tgg gat cat act cgt caa tac tgg gca gaa tct cgc tcc acc cgc		
2832		
Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg		
930	935	940
cag cat ctt cgt gga ggt gcg ccc cat ctt ctg ctt gga aag ctt tct		
2880		
Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Leu Gly Lys Leu Ser		
945	950	955
tct tac agc aca gca tcg acc ttc cag tgg aca aac ttc atc agg ccc		
2928		
Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro		
965	970	975
cgg gat ctg gaa tgg ctc gac ggt cat gcg cta caa ggc cag act gtg		
2976		
Arg Asp Leu Glu Trp Leu Asp Gly His Ala Leu Gln Gly Gln Thr Val		
980	985	990
ttc ccc gct gct ggg tac ata att atg gcc atg gaa gct gcc atg aag		
3024		
Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys		
995	1000	1005
gtg gct ggt gag cgt gcc gcc caa gtt cag ctc ctg gaa atc ttg		
3069		
Val Ala Gly Glu Arg Ala Ala Gln Val Gln Leu Leu Glu Ile Leu		
1010	1015	1020
gac atg agc atc aac aaa gcc atc gtg ttt gaa gat gaa aac acc		
3114		
Asp Met Ser Ile Asn Lys Ala Ile Val Phe Glu Asp Glu Asn Thr		
1025	1030	1035

tcc gtg gag ctg aac ttg aca gcc gaa gtc acc agt gac aat gat
 3159
 Ser Val Glu Leu Asn Leu Thr Ala Glu Val Thr Ser Asp Asn Asp

1040

1045

1050

gcg gat ggc caa gtc acg gtc aaa ttt gtt att gat tcc tgt ctg
 3204
 Ala Asp Gly Gln Val Thr Val Lys Phe Val Ile Asp Ser Cys Leu

1055

1060

1065

gca aag gag agt gag ctt tcg aca tcc gcc aaa ggc caa atc gtc
 3249
 Ala Lys Glu Ser Glu Leu Ser Thr Ser Ala Lys Gly Gln Ile Val

1070

1075

1080

ata acc ctt ggc gag gca tca ccg tca tcg cag ctt ttg ccg cca
 3294
 Ile Thr Leu Gly Glu Ala Ser Pro Ser Ser Gln Leu Leu Pro Pro

1085

1090

1095

cct gag gaa gag tac ccc cag atg aac aat gtc aac atc gat ttc
 3339
 Pro Glu Glu Glu Tyr Pro Gln Met Asn Asn Val Asn Ile Asp Phe

1100

1105

1110

ttc tat cgg gaa ctt gac ctc ctt ggg tat gac tac agc aaa gac
 3384
 Phe Tyr Arg Glu Leu Asp Leu Leu Gly Tyr Asp Tyr Ser Lys Asp

1115

1120

1125

ttc cgt cgt ttg cag acc atg aga agg gcc gac tcc aaa gct agc
 3429
 Phe Arg Arg Leu Gln Thr Met Arg Arg Ala Asp Ser Lys Ala Ser

1130

1135

1140

3789	Asn Ile	Val Phe Lys Pro Phe	Ser Pro Pro Thr Ala	Ser Thr Asp
	1250		1255	1260
cac cga	atc ttc gca aag tgg	gtc tgg gga ccc ctc	acg ccc gaa	
3834	His Arg	Ile Phe Ala Lys Trp	Val Trp Gly Pro Leu	Thr Pro Glu
	1265		1270	1275
aaa ctg	ctg gag gac cct gcg	acg ttg atc ata gct	cgg gac aag	
3879	Lys Leu	Leu Glu Asp Pro Ala	Thr Leu Ile Ile Ala	Arg Asp Lys
	1280		1285	1290
gag gac	att ctg acc atc gag	cga atc gtt tac ttc	tac atc aaa	
3924	Glu Asp	Ile Leu Thr Ile Glu	Arg Ile Val Tyr Phe	Tyr Ile Lys
	1295		1300	1305
tcc ttc	cta gcc cag ata acc	ccc gac gac cgt caa	aat gcc gac	
3969	Ser Phe	Leu Ala Gln Ile Thr	Pro Asp Asp Arg Gln	Asn Ala Asp
	1310		1315	1320
ctc cat	tcc cag aag tac att	gaa tgg tgt gac cag	gtt cag gcc	
4014	Leu His	Ser Gln Lys Tyr Ile	Glu Trp Cys Asp Gln	Val Gln Ala
	1325		1330	1335
gat gct	cgg gct ggc cac cat	cag tgg tac cag gag	tct tgg gag	
4059	Asp Ala	Arg Ala Gly His His	Gln Trp Tyr Gln Glu	Ser Trp Glu
	1340		1345	1350
gag gac	act tct gtt cac att	gag caa atg tgt gaa	agc aac tcg	
4104				

Glu Asp	Thr Ser Val His Ile	Glu Gln Met Cys Glu	Ser Asn Ser
1355	1360	1365	

tcc cac	cca cat gtg cgc ctg	atc caa agg gta ggc	aaa gaa tta
4149			
Ser His	Pro His Val Arg Leu	Ile Gln Arg Val Gly	Lys Glu Leu
1370	1375	1380	

att tca	att gtt cgc ggg aac	ggg gat cct ttg gat	atc atg aac
4194			
Ile Ser	Ile Val Arg Gly Asn	Gly Asp Pro Leu Asp	Ile Met Asn
1385	1390	1395	

cgc gat	ggg ttg ttc acc gag	tac tat acc aac aag	ctc gcc ttt
4239			
Arg Asp	Gly Leu Phe Thr Glu	Tyr Tyr Thr Asn Lys	Leu Ala Phe
1400	1405	1410	

ggc tca	gca ata cac gtc gtt	cag gat ctg gtt agc	caa att gct
4284			
Gly Ser	Ala Ile His Val Val	Gln Asp Leu Val Ser	Gln Ile Ala
1415	1420	1425	

cat cgc	tac caa tcc att gat	atc ctt gag atc ggc	ttg ggt aca
4329			
His Arg	Tyr Gln Ser Ile Asp	Ile Leu Glu Ile Gly	Leu Gly Thr
1430	1435	1440	

ggc atc	gcc acg aag cgc gtt	ctt gca tca cct caa	ctt ggt ttc
4374			
Gly Ile	Ala Thr Lys Arg Val	Leu Ala Ser Pro Gln	Leu Gly Phe
1445	1450	1455	

aac agt	tac act tgc act gac	atc tcg gcg gat gtt	att ggc aag
4419			
Asn Ser	Tyr Thr Cys Thr Asp	Ile Ser Ala Asp Val	Ile Gly Lys

1460		1465		1470
gcc cgt	gaa caa ctt tcc gaa	ttc gac ggt ctc atg	cag ttt gag	
4464				
Ala Arg	Glu Gln Leu Ser Glu	Phe Asp Gly Leu Met	Gln Phe Glu	
1475		1480		1485
gca cta	gac atc aac aga agc	cca gca gag caa gga	ttc aag cct	
4509				
Ala Leu	Asp Ile Asn Arg Ser	Pro Ala Glu Gln Gly	Phe Lys Pro	
1490		1495		1500
cac tcc	tac gat ctg att att	gca tcc gat gtc ctc	cat gcc agc	
4554				
His Ser	Tyr Asp Leu Ile Ile	Ala Ser Asp Val Leu	His Ala Ser	
1505		1510		1515
tcc aac	ttc gag gaa aaa ttg	gct cac ata agg tcc	ttg ctc aag	
4599				
Ser Asn	Phe Glu Glu Lys Leu	Ala His Ile Arg Ser	Leu Leu Lys	
1520		1525		1530
ccg ggt	ggt cac ttg gtt act	ttc ggg gtc acc cat	cgc gag cct	
4644				
Pro Gly	Gly His Leu Val Thr	Phe Gly Val Thr His	Arg Glu Pro	
1535		1540		1545
gct cgc	ctc gcc ttc atc tct	ggg ctt ttc gct gat	cga tgg act	
4689				
Ala Arg	Leu Ala Phe Ile Ser	Gly Leu Phe Ala Asp	Arg Trp Thr	
1550		1555		1560
gga gaa	gac gaa act cgt gct	ttg agt gcc tcg ggg	tcc gtt gac	
4734				
Gly Glu	Asp Glu Thr Arg Ala	Leu Ser Ala Ser Gly	Ser Val Asp	

1565	1570	1575
caa·tgg 4779	gag cat acc ctc aag	aga gtt ggg ttc tct ggc gtc gat
Gln Trp	Glu His Thr Leu Lys	Arg Val Gly Phe Ser Gly Val Asp
1580	1585	1590
agt cgg 4824	aca ctt gat cga gag	gat gat ttg atc ccg tct gtc ttc
Ser Arg	Thr Leu Asp Arg Glu	Asp Asp Leu Ile Pro Ser Val Phe
1595	1600	1605
agt aca 4869	cat gct gtg gat gcc	acc gtt gag cgt ttg tat gat cca
Ser Thr	His Ala Val Asp Ala	Thr Val Glu Arg Leu Tyr Asp Pro
1610	1615	1620
ctt tct 4914	gct cca ttg aag gac	tca tac ccg cca tta gtg gtt atc
Leu Ser	Ala Pro Leu Lys Asp	Ser Tyr Pro Pro Leu Val Val Ile
1625	1630	1635
ggg ggc 4959	gaa tcg aca aaa acc	gaa cgc att ttg aac gac atg aaa
Gly Gly	Glu Ser Thr Lys Thr	Glu Arg Ile Leu Asn Asp Met Lys
1640	1645	1650
gct gcc 5004	cta ccg cat aga cac	atc cac tcc gtc aag cgg ctg gaa
Ala Ala	Leu Pro His Arg His	Ile His Ser Val Lys Arg Leu Glu
1655	1660	1665
agt gtt 5049	ctc gac gac ccg gcc	ttg cag cct aag tcg act ttt gtc
Ser Val	Leu Asp Asp Pro Ala	Leu Gln Pro Lys Ser Thr Phe Val
1670	1675	1680

atc ctc tcg gaa ctt gat gat gaa gtg ttt tgc aac ctt gaa gag
 5094
 Ile Leu Ser Glu Leu Asp Asp Glu Val Phe Cys Asn Leu Glu Glu

1685

1690

1695

gac aag ttt gag gca gtc aag tct ctt ctc ttc tac gcc gga cgc
 5139
 Asp Lys Phe Glu Ala Val Lys Ser Leu Leu Phe Tyr Ala Gly Arg

1700

1705

1710

atg atg tgg ctg aca gag aat gcc tgg att gat cat ccc cac cag
 5184
 Met Met Trp Leu Thr Glu Asn Ala Trp Ile Asp His Pro His Gln

1715

1720

1725

gcc agc acc atc gga atg ttg agg aca atc aag ctc gag aac cct
 5229
 Ala Ser Thr Ile Gly Met Leu Arg Thr Ile Lys Leu Glu Asn Pro

1730

1735

1740

gac ttg gga acg cac gtc ttc gat gtc gat act gtg gag aac cta
 5274
 Asp Leu Gly Thr His Val Phe Asp Val Asp Thr Val Glu Asn Leu

1745

1750

1755

gac acc aaa ttc ttc gtt gag caa ctt ttg cgc ttc gag gag agc
 5319
 Asp Thr Lys Phe Phe Val Glu Gln Leu Leu Arg Phe Glu Glu Ser

1760

1765

1770

gat gat cag ctt ttg gaa tca ata aca tgg act cat gag ccc gaa
 5364
 Asp Asp Gln Leu Leu Glu Ser Ile Thr Trp Thr His Glu Pro Glu

1775

1780

1785

gtg tac tgg tgc aag ggt cgt gcc tgg gtc cct cgt ttg aag cag
5409
Val Tyr Trp Cys Lys Gly Arg Ala Trp Val Pro Arg Leu Lys Gln
1790 1795 1800

gat att gct agg aac gac cgt atg aac tcg tct cgt cgt cca att
5454
Asp Ile Ala Arg Asn Asp Arg Met Asn Ser Ser Arg Arg Pro Ile
1805 1810 1815

ttc ggt aac ttt aat tcg tcc aag acg gcc att gca ctg aaa gag
5499
Phe Gly Asn Phe Asn Ser Ser Lys Thr Ala Ile Ala Leu Lys Glu
1820 1825 1830

gcg agg gga gca tcc tca tcg atg tac tat ctt gag tca acc gag
5544
Ala Arg Gly Ala Ser Ser Ser Met Tyr Tyr Leu Glu Ser Thr Glu
1835 1840 1845

acg tgt gat tcg tta gaa gac gct cgt cat gct gga aaa gca act
5589
Thr Cys Asp Ser Leu Glu Asp Ala Arg His Ala Gly Lys Ala Thr
1850 1855 1860

gtt cgt gtt cgc tac gct ctt ccc cag gca att cgc gtg ggc cat
5634
Val Arg Val Arg Tyr Ala Leu Pro Gln Ala Ile Arg Val Gly His
1865 1870 1875

ctc gga tac ttc cat gtc gtg cag ggc agt att ctg gag aat aca
5679
Leu Gly Tyr Phe His Val Val Gln Gly Ser Ile Leu Glu Asn Thr
1880 1885 1890

tgt gag gtg cct gta gtc gcc ctg gct gag aag aat gga tct ata

5724
 Cys Glu Val Pro Val Val Ala Leu Ala Glu Lys Asn Gly Ser Ile
 1895 1900 1905

ctg cat gta ccg aga aac tac atg cat agt ctg ccc gat aac atg
 5769
 Leu His Val Pro Arg Asn Tyr Met His Ser Leu Pro Asp Asn Met
 1910 1915 1920

gcg gaa ggc gag gat agt tcc ttc ttg ttg tcc aca gct gca gcc
 5814
 Ala Glu Gly Glu Asp Ser Ser Phe Leu Leu Ser Thr Ala Ala Ala
 1925 1930 1935

ctc ctt gcc gaa aca att ctc tct agc gct cag tcc ttt ggc tct
 5859
 Leu Leu Ala Glu Thr Ile Leu Ser Ser Ala Gln Ser Phe Gly Ser
 1940 1945 1950

gat gca tca att ctg att atg gag ccc cca atc ttc tgc gtc aaa
 5904
 Asp Ala Ser Ile Leu Ile Met Glu Pro Pro Ile Phe Cys Val Lys
 1955 1960 1965

gca att ctg gag tcg gcc aaa acc tac ggt gtt cag gtt cat ttg
 5949
 Ala Ile Leu Glu Ser Ala Lys Thr Tyr Gly Val Gln Val His Leu
 1970 1975 1980

gca aca act ctg tcc gac gtc aaa act att ccg gct cct tgg atc
 5994
 Ala Thr Thr Leu Ser Asp Val Lys Thr Ile Pro Ala Pro Trp Ile
 1985 1990 1995

cga tta cat gcc aag gaa acc gac gct cgg ctg aaa cac agc ctg
 6039

Arg Leu	His Ala Lys Glu Thr	Asp Ala Arg Leu Lys	His Ser Leu
2000	2005	2010	
ccg aca 6084	aac atg atg gca ttc	ttt gac ttg tct acc	gac cgg act
Pro Thr	Asn Met Met Ala Phe	Phe Asp Leu Ser Thr	Asp Arg Thr
2015	2020	2025	
gct gcc 6129	ggg ata acc aac cgt	ttg gcc aag ttg cta	cca ccc agt
Ala Ala	Gly Ile Thr Asn Arg	Leu Ala Lys Leu Leu	Pro Pro Ser
2030	2035	2040	
tgc ttc 6174	atg tac agt ggt gac	tat ctt atc cga agt	aca gct tcc
Cys Phe	Met Tyr Ser Gly Asp	Tyr Leu Ile Arg Ser	Thr Ala Ser
2045	2050	2055	
aca tac 6219	aaa gtt agt cat gtt	gag gat att cca atc	ctc gag cac
Thr Tyr	Lys Val Ser His Val	Glu Asp Ile Pro Ile	Leu Glu His
2060	2065	2070	
tct gtg 6264	gca atg gca aaa aat	acc gtc tct gcg tcg	act gtc gac
Ser Val	Ala Met Ala Lys Asn	Thr Val Ser Ala Ser	Thr Val Asp
2075	2080	2085	
gac act 6309	gag aaa gtt att aca	gcc aca caa att ctc	ttg cct ggt
Asp Thr	Glu Lys Val Ile Thr	Ala Thr Gln Ile Leu	Leu Pro Gly
2090	2095	2100	
cag ctc 6354	tct gtc aac cac aat	gac caa cgc ttc aat	ctg gcc acc
Gln Leu	Ser Val Asn His Asn	Asp Gln Arg Phe Asn	Leu Ala Thr

2105	2110	2115
gtc atc 6399	gac tgg aag gaa aat	gag gtg tcc gct agg att tgc ccc
Val Ile	Asp Trp Lys Glu Asn	Glu Val Ser Ala Arg Ile Cys Pro
2120	2125	2130
atc gac 6444	tct ggt aac tta ttt	tcc aac aag aag acg tat ttg ctt
Ile Asp	Ser Gly Asn Leu Phe	Ser Asn Lys Lys Thr Tyr Leu Leu
2135	2140	2145
gtt ggt 6489	ctt acc ggg gac ctt	ggc cgc tct ctc tgt cgc tgg atg
Val Gly	Leu Thr Gly Asp Leu	Gly Arg Ser Leu Cys Arg Trp Met
2150	2155	2160
atc ttg 6534	cat ggc gcc cgc cat	gtt gtg ctc act agc cgg aac cct
Ile Leu	His Gly Ala Arg His	Val Val Leu Thr Ser Arg Asn Pro
2165	2170	2175
cga ctt 6579	gat ccc aaa tgg atc	gcc aac atg gag gca ctt ggt ggt
Arg Leu	Asp Pro Lys Trp Ile	Ala Asn Met Glu Ala Leu Gly Gly
2180	2185	2190
gac atc 6624	acc gtt ctg tca atg	gat gtt gcc aat gag gat tca gtc
Asp Ile	Thr Val Leu Ser Met	Asp Val Ala Asn Glu Asp Ser Val
2195	2200	2205
gat gct 6669	ggc ctt ggc aag ctt	gtc gat atg aag ttg cca cct gtt
Asp Ala	Gly Leu Gly Lys Leu	Val Asp Met Lys Leu Pro Pro Val

2210	2215	2220
gcc ggc atc gcg ttc ggg cct	ttg gtg ctg cag gat	gtc atg ctg
6714		
Ala Gly Ile Ala Phe Gly Pro	Leu Val Leu Gln Asp	Val Met Leu
2225	2230	2235
aag aac atg gac cac cag atg	atg gac atg gtg ttg	aag ccc aag
6759		
Lys Asn Met Asp His Gln Met	Met Asp Met Val Leu	Lys Pro Lys
2240	2245	2250
gta caa gga gca cgc att ctt	cat gaa cgg ttc tcc	gaa cag acg
6804		
Val Gln Gly Ala Arg Ile Leu	His Glu Arg Phe Ser	Glu Gln Thr
2255	2260	2265
ggc agc aag gcg ctc gac ttc	ttc atc atg ttt tcg	tcc att gtt
6849		
Gly Ser Lys Ala Leu Asp Phe	Phe Ile Met Phe Ser	Ser Ile Val
2270	2275	2280
gca gtt att ggc aat cct ggc	cag tcc aac tat ggc	gct gcg aat
6894		
Ala Val Ile Gly Asn Pro Gly	Gln Ser Asn Tyr Gly	Ala Ala Asn
2285	2290	2295
gcc tac cta cag gct ctg gcc	cag caa cgg tgc gcc	aga gga ttg
6939		
Ala Tyr Leu Gln Ala Leu Ala	Gln Gln Arg Cys Ala	Arg Gly Leu
2300	2305	2310
gcg gga tca acc atc gat att	ggc gcc gtt tac ggt	gta ggg ttt
6984		
Ala Gly Ser Thr Ile Asp Ile	Gly Ala Val Tyr Gly	Val Gly Phe
2315	2320	2325

gtc acg agg gcc gag atg gag gag gac ttt gat gct atc cgt ttc
7029

Val Thr Arg Ala Glu Met Glu Glu Asp Phe Asp Ala Ile Arg Phe

2330

2335

2340

atg ttt gac tca gtt gaa gag cat gag ctg cac acg ctt ttc gcc
7074

Met Phe Asp Ser Val Glu Glu His Glu Leu His Thr Leu Phe Ala

2345

2350

2355

gaa gcg gtc gtg tct gac cag cgt gcc cgg cag caa cca cag cgc
7119

Glu Ala Val Val Ser Asp Gln Arg Ala Arg Gln Gln Pro Gln Arg

2360

2365

2370

aag acg gtc att gac atg gcg gac ctt gag ctt acc acg ggt atc
7164

Lys Thr Val Ile Asp Met Ala Asp Leu Glu Leu Thr Thr Gly Ile

2375

2380

2385

cca gat ctt gac cct gcg ctt caa gat cga att att tac ttc aac
7209

Pro Asp Leu Asp Pro Ala Leu Gln Asp Arg Ile Ile Tyr Phe Asn

2390

2395

2400

gac cct cgt ttc gga aac ttc aaa att ccc ggt caa cgc gga gac
7254

Asp Pro Arg Phe Gly Asn Phe Lys Ile Pro Gly Gln Arg Gly Asp

2405

2410

2415

ggt ggc gac aat gga tca ggg tct aaa ggc tcc att gcc gac cag
7299

Gly Gly Asp Asn Gly Ser Gly Ser Lys Gly Ser Ile Ala Asp Gln

2420

2425

2430

ctc aaa caa gca aca act tta gac caa gtt cgg caa atc gtg att
7344

Leu Lys Gln Ala Thr Thr Leu Asp Gln Val Arg Gln Ile Val Ile

2435 2440 2445

ggg gag agc gtg gac cca acc att cct ctc att gat caa ggt gtc
7434
Gly Glu Ser Val Asp Pro Thr Ile Pro Leu Ile Asp Gln Gly Val
2465 2470 2475

ctc tac	ctt gac	ctc cca	ctc	ttg agg	gta ctt	ggc	ggt gct	tct
7524								
Leu Tyr	Leu Asp	Leu Pro	Leu	Leu Arg	Val	Leu Gly	Gly Ala	Ser
2495			2500			2505		

tcc att	ccg ctg	ctg ttg	caa att	ggt gat	tcc acg	gga acc	tcg
7614							
Ser Ile	Pro Leu	Leu Leu	Gln Ile	Gly Asp	Ser Thr	Gly Thr	Ser
2525			2530			2535	

7659	Asp Ser Gly Ala Ser Pro Thr	Pro Thr Asp Ser His	Asp Glu Ala
2540		2545	2550
agc tct gct acc agc aca gat	gcg tcg tca gcc gaa	gag gat gaa	
7704	Ser Ser Ala Thr Ser Thr Asp	Ala Ser Ser Ala Glu	Glu Asp Glu
2555		2560	2565
gag caa gag gac gat aat gag	cag gga ggc cgt aag	att ctt cgt	
7749	Glu Gln Glu Asp Asp Asn Glu	Gln Gly Gly Arg Lys	Ile Leu Arg
2570		2575	2580
cgc gag agg ttg tcc ctt ggc	cag gag tat tcc tgg	agg cag caa	
7794	Arg Glu Arg Leu Ser Leu Gly	Gln Glu Tyr Ser Trp	Arg Gln Gln
2585		2590	2595
caa atg gta aaa gat cat acc	atc ttc aac aac act	att ggc atg	
7839	Gln Met Val Lys Asp His Thr	Ile Phe Asn Asn Thr	Ile Gly Met
2600		2605	2610
ttc atg aag ggt acc att gac	ctc gac cgg ttg agg	cgg gct ctg	
7884	Phe Met Lys Gly Thr Ile Asp	Leu Asp Arg Leu Arg	Arg Ala Leu
2615		2620	2625
aaa gcc tca ttg cgc cgt cac	gag atc ttc cgt acg	tgc ttt gtt	
7929	Lys Ala Ser Leu Arg Arg His	Glu Ile Phe Arg Thr	Cys Phe Val
2630		2635	2640
act ggc gat gac tat agc agc	gat tta aat ggt ccc	gtc caa gtg	
7974			

Thr Gly	Asp Asp Tyr Ser Ser	Asp Leu Asn Gly Pro	Val Gln Val
2645	2650	2655	
gtt ctc 8019	aag aac ccg gag aac	aga gtg cac ttt gtt	cag gtg aac
Val Leu	Lys Asn Pro Glu Asn	Arg Val His Phe Val	Gln Val Asn
2660	2665	2670	
aac gct 8064	gcg gag gca gag gaa	gag tac cgg aaa ctc	gag aag aca
Asn Ala	Ala Glu Ala Glu Glu	Glu Tyr Arg Lys Leu	Glu Lys Thr
2675	2680	2685	
aac tat 8109	agc atc tcc aca ggt	gac act ctc aga ctc	gtt gat ttc
Asn Tyr	Ser Ile Ser Thr Gly	Asp Thr Leu Arg Leu	Val Asp Phe
2690	2695	2700	
tac tgg 8154	ggc aca gat gac cac	ctg ttg gta atc ggc	tac cac aga
Tyr Trp	Gly Thr Asp Asp His	Leu Leu Val Ile Gly	Tyr His Arg
2705	2710	2715	
tta gtt 8199	ggt gat ggc tca aca	aca gaa aac ctg ttc	aat gag atc
Leu Val	Gly Asp Gly Ser Thr	Thr Glu Asn Leu Phe	Asn Glu Ile
2720	2725	2730	
ggg cag 8244	att tac agc ggg gtg	aaa atg cag cga cca	tcg acc caa
Gly Gln	Ile Tyr Ser Gly Val	Lys Met Gln Arg Pro	Ser Thr Gln
2735	2740	2745	
ttc tct 8289	gat cta gcc gtc caa	cag cgg gaa aac ctg	gaa aat ggg
Phe Ser	Asp Leu Ala Val Gln	Gln Arg Glu Asn Leu	Glu Asn Gly

2750	2755	2760
cga atg ggg gac gat atc gcg ttc tgg aag tcc atg cat agc aaa 8334		
Arg Met Gly Asp Asp Ile Ala Phe Trp Lys Ser Met His Ser Lys		
2765	2770	2775
gtc tcg tca tct gcg cca acc gtg ctt ccc atc atg aat ctg atc 8379		
Val Ser Ser Ser Ala Pro Thr Val Leu Pro Ile Met Asn Leu Ile		
2780	2785	2790
aat gac cct gct gcc aat tca gag cag cag caa ata cag cca ttc 8424		
Asn Asp Pro Ala Ala Asn Ser Glu Gln Gln Gln Ile Gln Pro Phe		
2795	2800	2805
acg tgg cag cag tat gaa gca att gct cgt tta gat ccc atg gtc 8469		
Thr Trp Gln Gln Tyr Glu Ala Ile Ala Arg Leu Asp Pro Met Val		
2810	2815	2820
gcc ttc cga atc aaa gag cgg agc cgc aag cac aag gca acc ccc 8514		
Ala Phe Arg Ile Lys Glu Arg Ser Arg Lys His Lys Ala Thr Pro		
2825	2830	2835
atg cag ttc tac ctg gcc gcc tac cac gtt ttg ttg gcg cgt ctt 8559		
Met Gln Phe Tyr Leu Ala Ala Tyr His Val Leu Leu Ala Arg Leu		
2840	2845	2850
acc ggc agc aaa gac ata acc atc ggc ctc gcc gaa acc aac cga 8604		
Thr Gly Ser Lys Asp Ile Thr Ile Gly Leu Ala Glu Thr Asn Arg		

2855	2860	2865
tcc acc atg gaa gaa att tcg gcg atg ggc ttt ttc gct aac gtg 8649		
Ser Thr Met Glu Glu Ile Ser Ala Met Gly Phe Phe Ala Asn Val		
2870	2875	2880
ctt ccc ctg cgc ttt gat gag ttc gtc ggc agc aag aca ttc ggc 8694		
Leu Pro Leu Arg Phe Asp Glu Phe Val Gly Ser Lys Thr Phe Gly		
2885	2890	2895
gag cac ctt gta gcc acc aag gac agt gtg cgt gag gcc atg caa 8739		
Glu His Leu Val Ala Thr Lys Asp Ser Val Arg Glu Ala Met Gln		
2900	2905	2910
cac gcg cgg gtg ccg tat ggc gtc atc ctc gac tgt cta ggc ctg 8784		
His Ala Arg Val Pro Tyr Gly Val Ile Leu Asp Cys Leu Gly Leu		
2915	2920	2925
aat ctc cct acc tca ggc gag gaa ccc aag act cag aca cac gcc 8829		
Asn Leu Pro Thr Ser Gly Glu Glu Pro Lys Thr Gln Thr His Ala		
2930	2935	2940
ccc ttg ttc cag gct gtc ttt gat tac aag cag ggt caa gcg gag 8874		
Pro Leu Phe Gln Ala Val Phe Asp Tyr Lys Gln Gly Gln Ala Glu		
2945	2950	2955
agt ggc tca att ggc aat gcc aaa atg acg agt gtt ctc gct tcc 8919		
Ser Gly Ser Ile Gly Asn Ala Lys Met Thr Ser Val Leu Ala Ser		
2960	2965	2970

cgt gag cgc act cct tat gac atc gtt ctc gag atg tgg gat gac
 8964
 Arg Glu Arg Thr Pro Tyr Asp Ile Val Leu Glu Met Trp Asp Asp
 2975 2980 2985

cct acc aag gac cca ctc att cat gtc aaa ctt cag agc tcg ctg
 9009
 Pro Thr Lys Asp Pro Leu Ile His Val Lys Leu Gln Ser Ser Leu
 2990 2995 3000

tat ggc cct gag cac gct cag gcc ttt gta gac cac ttt tct tca
 9054
 Tyr Gly Pro Glu His Ala Gln Ala Phe Val Asp His Phe Ser Ser
 3005 3010 3015

atc ctc act atg ttc tcg atg aac ccg gct ctg aag ttg gcc tag
 9099
 Ile Leu Thr Met Phe Ser Met Asn Pro Ala Leu Lys Leu Ala
 3020 3025 3030

<210> 44

<211> 3032

<212> PRT

<213> Penicillium citrinum

<400> 44

Met Asp Gln Ala Asn Tyr Pro Asn Glu Pro Ile Val Val Val Gly Ser
 1 5 10 15

Gly Cys Arg Phe Pro Gly Gly Val Asn Thr Pro Ser Lys Leu Trp Glu
 20 25 30

Leu	Leu	Lys	Glu	Pro	Arg	Asp	Val	Gln	Thr	Lys	Ile	Pro	Lys	Glu	Arg
		35					40					45			
Phe	Asp	Val	Asp	Thr	Phe	Tyr	Ser	Pro	Asp	Gly	Thr	His	Pro	Gly	Arg
	50					55					60				
Thr	Asn	Ala	Pro	Phe	Ala	Tyr	Leu	Leu	Gln	Glu	Asp	Leu	Arg	Gly	Phe
65					70					75					80
Asp	Ala	Ser	Phe	Phe	Asn	Ile	Gln	Ala	Gly	Glu	Ala	Glu	Thr	Ile	Asp
				85					90					95	
Pro	Gln	Gln	Arg	Leu	Leu	Leu	Glu	Thr	Val	Tyr	Glu	Ala	Val	Ser	Asn
			100					105					110		
Ala	Gly	Leu	Arg	Ile	Gln	Gly	Leu	Gln	Gly	Ser	Ser	Thr	Ala	Val	Tyr
		115					120					125			
Val	Gly	Met	Met	Thr	His	Asp	Tyr	Glu	Thr	Ile	Val	Thr	Arg	Glu	Leu
	130					135					140				
Asp	Ser	Ile	Pro	Thr	Tyr	Ser	Ala	Thr	Gly	Val	Ala	Val	Ser	Val	Ala
145					150					155					160
Ser	Asn	Arg	Val	Ser	Tyr	Phe	Phe	Asp	Trp	His	Gly	Pro	Ser	Met	Thr
				165					170					175	
Ile	Asp	Thr	Ala	Cys	Ser	Ser	Ser	Leu	Ala	Ala	Val	His	Leu	Ala	Val
			180					185					190		
Gln	Gln	Leu	Arg	Thr	Gly	Glu	Ser	Thr	Met	Ala	Val	Ala	Ala	Gly	Ala
		195					200					205			
Asn	Leu	Ile	Leu	Gly	Pro	Met	Thr	Phe	Val	Met	Glu	Ser	Lys	Leu	Asn
	210					215					220				
Met	Leu	Ser	Pro	Asn	Gly	Arg	Ser	Arg	Met	Trp	Asp	Ala	Ala	Ala	Asp
225					230					235					240

Gly	Tyr	Ala	Arg	Gly 245	Glu	Gly	Val	Cys	Ser 250	Ile	Val	Leu	Lys	Thr 255	Leu	
Ser	Gln	Ala	Leu 260	Arg	Asp	Gly	Asp	Ser 265	Ile	Glu	Cys	Val	Ile	Arg	Glu	
Thr	Gly	Ile 275	Asn	Gln	Asp	Gly	Arg 280	Thr	Thr	Gly	Ile	Thr 285	Met	Pro	Asn	
His	Ser 290	Ala	Gln	Glu	Ala	Leu 295	Ile	Arg	Ala	Thr	Tyr 300	Ala	Lys	Ala	Gly	
Leu 305	Asp	Ile	Thr	Asn	Pro 310	Gln	Glu	Arg	Cys	Gln 315	Phe	Phe	Glu	Ala	His 320	
Gly	Thr	Gly	Thr	Pro 325	Ala	Gly	Asp	Pro	Gln 330	Glu	Ala	Glu	Ala	Ile 335	Ala	
Thr	Ala	Phe	Phe 340	Gly	His	Lys	Asp	Gly 345	Thr	Ile	Asp	Ser	Asp 350	Gly	Glu	
Lys	Asp	Glu 355	Leu	Phe	Val	Gly	Ser 360	Ile	Lys	Thr	Val	Leu 365	Gly	His	Thr	
Glu	Gly 370	Thr	Ala	Gly	Ile	Ala 375	Gly	Leu	Met	Lys	Ala 380	Ser	Phe	Ala	Val	
Arg 385	Asn	Gly	Val	Ile	Pro 390	Pro	Asn	Leu	Leu	Phe 395	Glu	Lys	Ile	Ser	Pro 400	
Arg	Val	Ala	Pro	Phe 405	Tyr	Thr	His	Leu	Lys 410	Ile	Ala	Thr	Glu	Ala 415	Thr	
Glu	Trp	Pro	Ile 420	Val	Ala	Pro	Gly	Gln 425	Pro	Arg	Arg	Val	Ser 430	Val	Asn	
Ser	Phe	Gly	Phe	Gly	Gly	Thr	Asn	Ala	His	Ala	Ile	Ile	Glu	Glu	Tyr	

435					440					445					
Met	Ala	Pro	Pro	His	Lys	Pro	Thr	Ala	Val	Val	Thr	Glu	Val	Thr	Ser
450						455					460				
Asp	Ala	Asp	Ala	Cys	Ser	Leu	Pro	Leu	Val	Leu	Ser	Ser	Lys	Ser	Gln
465					470					475					480
Arg	Ser	Met	Lys	Ala	Thr	Leu	Glu	Asn	Met	Leu	Gln	Phe	Leu	Glu	Thr
				485					490					495	
His	Asp	Asp	Val	Asp	Met	His	Asp	Ile	Ala	Tyr	Thr	Leu	Leu	Glu	Lys
			500					505					510		
Arg	Ser	Ile	Leu	Pro	Phe	Arg	Arg	Ala	Ile	Ala	Ala	His	Asn	Lys	Glu
		515					520					525			
Val	Ala	Arg	Ala	Ala	Leu	Glu	Ala	Ala	Ile	Ala	Asp	Gly	Glu	Val	Val
	530					535					540				
Thr	Asp	Phe	Arg	Thr	Asp	Ala	Asn	Asp	Asn	Pro	Arg	Val	Leu	Gly	Val
545					550					555					560
Phe	Thr	Gly	Gln	Gly	Ala	Gln	Trp	Pro	Gly	Met	Leu	Lys	Lys	Leu	Met
				565					570					575	
Val	Gly	Met	Pro	Phe	Val	Arg	Gly	Ile	Leu	Glu	Glu	Leu	Asp	Asn	Ser
			580					585					590		
Leu	Gln	Thr	Leu	Pro	Glu	Lys	Tyr	Arg	Pro	Thr	Trp	Thr	Leu	Tyr	Asp
		595					600					605			
Gln	Leu	Met	Leu	Glu	Gly	Asp	Ala	Ser	Asn	Val	Arg	Leu	Ala	Ser	Phe
	610					615					620				
Ser	Gln	Pro	Leu	Cys	Cys	Ala	Val	Gln	Ile	Val	Leu	Val	Arg	Leu	Leu
625					630					635					640

Ala	Ala	Ala	Gly	Ile	Glu	Phe	Ser	Ala	Ile	Val	Gly	His	Ser	Ser	Gly
				645					650					655	
Glu	Ile	Ala	Cys	Ala	Phe	Ala	Ala	Gly	Phe	Ile	Ser	Ala	Thr	Gln	Ala
			660					665					670		
Ile	Arg	Ile	Ala	His	Leu	Arg	Gly	Val	Val	Ser	Ala	Glu	His	Ala	Ser
		675					680					685			
Ser	Pro	Ser	Gly	Gln	Thr	Gly	Ala	Met	Leu	Ala	Ala	Gly	Met	Ser	Tyr
	690					695					700				
Asp	Asp	Ala	Lys	Glu	Leu	Cys	Glu	Leu	Glu	Ala	Phe	Glu	Gly	Arg	Val
705					710					715					720
Cys	Val	Ala	Ala	Ser	Asn	Ser	Pro	Asp	Ser	Val	Thr	Phe	Ser	Gly	Asp
				725					730					735	
Met	Asp	Ala	Ile	Gln	His	Val	Glu	Gly	Val	Leu	Glu	Asp	Glu	Ser	Thr
			740					745					750		
Phe	Ala	Arg	Ile	Leu	Arg	Val	Asp	Lys	Ala	Tyr	His	Ser	His	His	Met
		755					760					765			
His	Pro	Cys	Ala	Ala	Pro	Tyr	Val	Lys	Ala	Leu	Leu	Glu	Cys	Asp	Cys
	770					775					780				
Ala	Val	Ala	Asp	Gly	Gln	Gly	Asn	Asp	Ser	Val	Ala	Trp	Phe	Ser	Ala
785					790					795					800
Val	His	Glu	Thr	Ser	Lys	Gln	Met	Thr	Val	Gln	Asp	Val	Met	Pro	Ala
				805					810					815	
Tyr	Trp	Lys	Asp	Asn	Leu	Val	Ser	Pro	Val	Leu	Phe	Ser	Gln	Ala	Val
			820					825					830		
Gln	Lys	Ala	Val	Ile	Thr	His	Arg	Leu	Ile	Asp	Val	Ala	Ile	Glu	Ile
		835					840					845			

Gly Ala His Pro Ala Leu Lys Gly Pro Cys Leu Ala Thr Ile Lys Asp
850 855 860

Ala Leu Ala Gly Val Glu Leu Pro Tyr Thr Gly Cys Leu Ala Arg Asn
865 870 875 880

Val Asp Asp Val Asp Ala Phe Ala Gly Gly Leu Gly Tyr Ile Trp Glu
885 890 895

Arg Phe Gly Val Arg Ser Ile Asp Ala Glu Gly Phe Val Gln Gln Val
900 905 910

Arg Pro Asp Arg Ala Val Gln Asn Leu Ser Lys Ser Leu Pro Thr Tyr
915 920 925

Ser Trp Asp His Thr Arg Gln Tyr Trp Ala Glu Ser Arg Ser Thr Arg
930 935 940

Gln His Leu Arg Gly Gly Ala Pro His Leu Leu Leu Gly Lys Leu Ser
945 950 955 960

Ser Tyr Ser Thr Ala Ser Thr Phe Gln Trp Thr Asn Phe Ile Arg Pro
965 970 975

Arg Asp Leu Glu Trp Leu Asp Gly His Ala Leu Gln Gly Gln Thr Val
980 985 990

Phe Pro Ala Ala Gly Tyr Ile Ile Met Ala Met Glu Ala Ala Met Lys
995 1000 1005

Val Ala Gly Glu Arg Ala Ala Gln Val Gln Leu Leu Glu Ile Leu
1010 1015 1020

Asp Met Ser Ile Asn Lys Ala Ile Val Phe Glu Asp Glu Asn Thr
1025 1030 1035

Ser Val Glu Leu Asn Leu Thr Ala Glu Val Thr Ser Asp Asn Asp

1040					1045					1050				
Ala	Asp	Gly	Gln	Val	Thr	Val	Lys	Phe	Val	Ile	Asp	Ser	Cys	Leu
	1055					1060					1065			
Ala	Lys	Glu	Ser	Glu	Leu	Ser	Thr	Ser	Ala	Lys	Gly	Gln	Ile	Val
	1070					1075					1080			
Ile	Thr	Leu	Gly	Glu	Ala	Ser	Pro	Ser	Ser	Gln	Leu	Leu	Pro	Pro
	1085					1090					1095			
Pro	Glu	Glu	Glu	Tyr	Pro	Gln	Met	Asn	Asn	Val	Asn	Ile	Asp	Phe
	1100					1105					1110			
Phe	Tyr	Arg	Glu	Leu	Asp	Leu	Leu	Gly	Tyr	Asp	Tyr	Ser	Lys	Asp
	1115					1120					1125			
Phe	Arg	Arg	Leu	Gln	Thr	Met	Arg	Arg	Ala	Asp	Ser	Lys	Ala	Ser
	1130					1135					1140			
Gly	Thr	Leu	Ala	Phe	Leu	Pro	Leu	Lys	Asp	Glu	Leu	Arg	Asn	Glu
	1145					1150					1155			
Pro	Leu	Leu	Leu	His	Pro	Ala	Pro	Leu	Asp	Ile	Ala	Phe	Gln	Thr
	1160					1165					1170			
Val	Ile	Gly	Ala	Tyr	Ser	Ser	Pro	Gly	Asp	Arg	Arg	Leu	Arg	Ser
	1175					1180					1185			
Leu	Tyr	Val	Pro	Thr	His	Val	Asp	Arg	Val	Thr	Leu	Ile	Pro	Ser
	1190					1195					1200			
Leu	Cys	Ile	Ser	Ala	Gly	Asn	Ser	Gly	Glu	Thr	Glu	Leu	Ala	Phe
	1205					1210					1215			
Asp	Thr	Ile	Asn	Thr	His	Asp	Lys	Gly	Asp	Phe	Leu	Ser	Gly	Asp
	1220					1225					1230			

Ile	Thr	Val	Tyr	Asp	Ser	Thr	Lys	Thr	Thr	Leu	Phe	Gln	Val	Asp
1235						1240					1245			
Asn	Ile	Val	Phe	Lys	Pro	Phe	Ser	Pro	Pro	Thr	Ala	Ser	Thr	Asp
1250						1255					1260			
His	Arg	Ile	Phe	Ala	Lys	Trp	Val	Trp	Gly	Pro	Leu	Thr	Pro	Glu
1265						1270					1275			
Lys	Leu	Leu	Glu	Asp	Pro	Ala	Thr	Leu	Ile	Ile	Ala	Arg	Asp	Lys
1280						1285					1290			
Glu	Asp	Ile	Leu	Thr	Ile	Glu	Arg	Ile	Val	Tyr	Phe	Tyr	Ile	Lys
1295						1300					1305			
Ser	Phe	Leu	Ala	Gln	Ile	Thr	Pro	Asp	Asp	Arg	Gln	Asn	Ala	Asp
1310						1315					1320			
Leu	His	Ser	Gln	Lys	Tyr	Ile	Glu	Trp	Cys	Asp	Gln	Val	Gln	Ala
1325						1330					1335			
Asp	Ala	Arg	Ala	Gly	His	His	Gln	Trp	Tyr	Gln	Glu	Ser	Trp	Glu
1340						1345					1350			
Glu	Asp	Thr	Ser	Val	His	Ile	Glu	Gln	Met	Cys	Glu	Ser	Asn	Ser
1355						1360					1365			
Ser	His	Pro	His	Val	Arg	Leu	Ile	Gln	Arg	Val	Gly	Lys	Glu	Leu
1370						1375					1380			
Ile	Ser	Ile	Val	Arg	Gly	Asn	Gly	Asp	Pro	Leu	Asp	Ile	Met	Asn
1385						1390					1395			
Arg	Asp	Gly	Leu	Phe	Thr	Glu	Tyr	Tyr	Thr	Asn	Lys	Leu	Ala	Phe
1400						1405					1410			
Gly	Ser	Ala	Ile	His	Val	Val	Gln	Asp	Leu	Val	Ser	Gln	Ile	Ala
1415						1420					1425			

His	Arg	Tyr	Gln	Ser	Ile	Asp	Ile	Leu	Glu	Ile	Gly	Leu	Gly	Thr
	1430					1435					1440			
Gly	Ile	Ala	Thr	Lys	Arg	Val	Leu	Ala	Ser	Pro	Gln	Leu	Gly	Phe
	1445					1450					1455			
Asn	Ser	Tyr	Thr	Cys	Thr	Asp	Ile	Ser	Ala	Asp	Val	Ile	Gly	Lys
	1460					1465					1470			
Ala	Arg	Glu	Gln	Leu	Ser	Glu	Phe	Asp	Gly	Leu	Met	Gln	Phe	Glu
	1475					1480					1485			
Ala	Leu	Asp	Ile	Asn	Arg	Ser	Pro	Ala	Glu	Gln	Gly	Phe	Lys	Pro
	1490					1495					1500			
His	Ser	Tyr	Asp	Leu	Ile	Ile	Ala	Ser	Asp	Val	Leu	His	Ala	Ser
	1505					1510					1515			
Ser	Asn	Phe	Glu	Glu	Lys	Leu	Ala	His	Ile	Arg	Ser	Leu	Leu	Lys
	1520					1525					1530			
Pro	Gly	Gly	His	Leu	Val	Thr	Phe	Gly	Val	Thr	His	Arg	Glu	Pro
	1535					1540					1545			
Ala	Arg	Leu	Ala	Phe	Ile	Ser	Gly	Leu	Phe	Ala	Asp	Arg	Trp	Thr
	1550					1555					1560			
Gly	Glu	Asp	Glu	Thr	Arg	Ala	Leu	Ser	Ala	Ser	Gly	Ser	Val	Asp
	1565					1570					1575			
Gln	Trp	Glu	His	Thr	Leu	Lys	Arg	Val	Gly	Phe	Ser	Gly	Val	Asp
	1580					1585					1590			
Ser	Arg	Thr	Leu	Asp	Arg	Glu	Asp	Asp	Leu	Ile	Pro	Ser	Val	Phe
	1595					1600					1605			
Ser	Thr	His	Ala	Val	Asp	Ala	Thr	Val	Glu	Arg	Leu	Tyr	Asp	Pro

1610						1615				1620				
Leu	Ser	Ala	Pro	Leu	Lys	Asp	Ser	Tyr	Pro	Pro	Leu	Val	Val	Ile
1625						1630					1635			
Gly	Gly	Glu	Ser	Thr	Lys	Thr	Glu	Arg	Ile	Leu	Asn	Asp	Met	Lys
1640						1645					1650			
Ala	Ala	Leu	Pro	His	Arg	His	Ile	His	Ser	Val	Lys	Arg	Leu	Glu
1655						1660					1665			
Ser	Val	Leu	Asp	Asp	Pro	Ala	Leu	Gln	Pro	Lys	Ser	Thr	Phe	Val
1670						1675					1680			
Ile	Leu	Ser	Glu	Leu	Asp	Asp	Glu	Val	Phe	Cys	Asn	Leu	Glu	Glu
1685						1690					1695			
Asp	Lys	Phe	Glu	Ala	Val	Lys	Ser	Leu	Leu	Phe	Tyr	Ala	Gly	Arg
1700						1705					1710			
Met	Met	Trp	Leu	Thr	Glu	Asn	Ala	Trp	Ile	Asp	His	Pro	His	Gln
1715						1720					1725			
Ala	Ser	Thr	Ile	Gly	Met	Leu	Arg	Thr	Ile	Lys	Leu	Glu	Asn	Pro
1730						1735					1740			
Asp	Leu	Gly	Thr	His	Val	Phe	Asp	Val	Asp	Thr	Val	Glu	Asn	Leu
1745						1750					1755			
Asp	Thr	Lys	Phe	Phe	Val	Glu	Gln	Leu	Leu	Arg	Phe	Glu	Glu	Ser
1760						1765					1770			
Asp	Asp	Gln	Leu	Leu	Glu	Ser	Ile	Thr	Trp	Thr	His	Glu	Pro	Glu
1775						1780					1785			
Val	Tyr	Trp	Cys	Lys	Gly	Arg	Ala	Trp	Val	Pro	Arg	Leu	Lys	Gln
1790						1795					1800			

Asp	Ile	Ala	Arg	Asn	Asp	Arg	Met	Asn	Ser	Ser	Arg	Arg	Pro	Ile
	1805					1810					1815			
Phe	Gly	Asn	Phe	Asn	Ser	Ser	Lys	Thr	Ala	Ile	Ala	Leu	Lys	Glu
	1820					1825					1830			
Ala	Arg	Gly	Ala	Ser	Ser	Ser	Met	Tyr	Tyr	Leu	Glu	Ser	Thr	Glu
	1835					1840					1845			
Thr	Cys	Asp	Ser	Leu	Glu	Asp	Ala	Arg	His	Ala	Gly	Lys	Ala	Thr
	1850					1855					1860			
Val	Arg	Val	Arg	Tyr	Ala	Leu	Pro	Gln	Ala	Ile	Arg	Val	Gly	His
	1865					1870					1875			
Leu	Gly	Tyr	Phe	His	Val	Val	Gln	Gly	Ser	Ile	Leu	Glu	Asn	Thr
	1880					1885					1890			
Cys	Glu	Val	Pro	Val	Val	Ala	Leu	Ala	Glu	Lys	Asn	Gly	Ser	Ile
	1895					1900					1905			
Leu	His	Val	Pro	Arg	Asn	Tyr	Met	His	Ser	Leu	Pro	Asp	Asn	Met
	1910					1915					1920			
Ala	Glu	Gly	Glu	Asp	Ser	Ser	Phe	Leu	Leu	Ser	Thr	Ala	Ala	Ala
	1925					1930					1935			
Leu	Leu	Ala	Glu	Thr	Ile	Leu	Ser	Ser	Ala	Gln	Ser	Phe	Gly	Ser
	1940					1945					1950			
Asp	Ala	Ser	Ile	Leu	Ile	Met	Glu	Pro	Pro	Ile	Phe	Cys	Val	Lys
	1955					1960					1965			
Ala	Ile	Leu	Glu	Ser	Ala	Lys	Thr	Tyr	Gly	Val	Gln	Val	His	Leu
	1970					1975					1980			
Ala	Thr	Thr	Leu	Ser	Asp	Val	Lys	Thr	Ile	Pro	Ala	Pro	Trp	Ile
	1985					1990					1995			

Arg	Leu	His	Ala	Lys	Glu	Thr	Asp	Ala	Arg	Leu	Lys	His	Ser	Leu
	2000					2005					2010			
Pro	Thr	Asn	Met	Met	Ala	Phe	Phe	Asp	Leu	Ser	Thr	Asp	Arg	Thr
	2015					2020					2025			
Ala	Ala	Gly	Ile	Thr	Asn	Arg	Leu	Ala	Lys	Leu	Leu	Pro	Pro	Ser
	2030					2035					2040			
Cys	Phe	Met	Tyr	Ser	Gly	Asp	Tyr	Leu	Ile	Arg	Ser	Thr	Ala	Ser
	2045					2050					2055			
Thr	Tyr	Lys	Val	Ser	His	Val	Glu	Asp	Ile	Pro	Ile	Leu	Glu	His
	2060					2065					2070			
Ser	Val	Ala	Met	Ala	Lys	Asn	Thr	Val	Ser	Ala	Ser	Thr	Val	Asp
	2075					2080					2085			
Asp	Thr	Glu	Lys	Val	Ile	Thr	Ala	Thr	Gln	Ile	Leu	Leu	Pro	Gly
	2090					2095					2100			
Gln	Leu	Ser	Val	Asn	His	Asn	Asp	Gln	Arg	Phe	Asn	Leu	Ala	Thr
	2105					2110					2115			
Val	Ile	Asp	Trp	Lys	Glu	Asn	Glu	Val	Ser	Ala	Arg	Ile	Cys	Pro
	2120					2125					2130			
Ile	Asp	Ser	Gly	Asn	Leu	Phe	Ser	Asn	Lys	Lys	Thr	Tyr	Leu	Leu
	2135					2140					2145			
Val	Gly	Leu	Thr	Gly	Asp	Leu	Gly	Arg	Ser	Leu	Cys	Arg	Trp	Met
	2150					2155					2160			
Ile	Leu	His	Gly	Ala	Arg	His	Val	Val	Leu	Thr	Ser	Arg	Asn	Pro
	2165					2170					2175			
Arg	Leu	Asp	Pro	Lys	Trp	Ile	Ala	Asn	Met	Glu	Ala	Leu	Gly	Gly

2180						2185				2190				
Asp	Ile	Thr	Val	Leu	Ser	Met	Asp	Val	Ala	Asn	Glu	Asp	Ser	Val
2195						2200					2205			
Asp	Ala	Gly	Leu	Gly	Lys	Leu	Val	Asp	Met	Lys	Leu	Pro	Pro	Val
2210						2215					2220			
Ala	Gly	Ile	Ala	Phe	Gly	Pro	Leu	Val	Leu	Gln	Asp	Val	Met	Leu
2225						2230					2235			
Lys	Asn	Met	Asp	His	Gln	Met	Met	Asp	Met	Val	Leu	Lys	Pro	Lys
2240						2245					2250			
Val	Gln	Gly	Ala	Arg	Ile	Leu	His	Glu	Arg	Phe	Ser	Glu	Gln	Thr
2255						2260					2265			
Gly	Ser	Lys	Ala	Leu	Asp	Phe	Phe	Ile	Met	Phe	Ser	Ser	Ile	Val
2270						2275					2280			
Ala	Val	Ile	Gly	Asn	Pro	Gly	Gln	Ser	Asn	Tyr	Gly	Ala	Ala	Asn
2285						2290					2295			
Ala	Tyr	Leu	Gln	Ala	Leu	Ala	Gln	Gln	Arg	Cys	Ala	Arg	Gly	Leu
2300						2305					2310			
Ala	Gly	Ser	Thr	Ile	Asp	Ile	Gly	Ala	Val	Tyr	Gly	Val	Gly	Phe
2315						2320					2325			
Val	Thr	Arg	Ala	Glu	Met	Glu	Glu	Asp	Phe	Asp	Ala	Ile	Arg	Phe
2330						2335					2340			
Met	Phe	Asp	Ser	Val	Glu	Glu	His	Glu	Leu	His	Thr	Leu	Phe	Ala
2345						2350					2355			
Glu	Ala	Val	Val	Ser	Asp	Gln	Arg	Ala	Arg	Gln	Gln	Pro	Gln	Arg
2360						2365					2370			

Lys	Thr	Val	Ile	Asp	Met	Ala	Asp	Leu	Glu	Leu	Thr	Thr	Gly	Ile
	2375					2380					2385			
Pro	Asp	Leu	Asp	Pro	Ala	Leu	Gln	Asp	Arg	Ile	Ile	Tyr	Phe	Asn
	2390					2395					2400			
Asp	Pro	Arg	Phe	Gly	Asn	Phe	Lys	Ile	Pro	Gly	Gln	Arg	Gly	Asp
	2405					2410					2415			
Gly	Gly	Asp	Asn	Gly	Ser	Gly	Ser	Lys	Gly	Ser	Ile	Ala	Asp	Gln
	2420					2425					2430			
Leu	Lys	Gln	Ala	Thr	Thr	Leu	Asp	Gln	Val	Arg	Gln	Ile	Val	Ile
	2435					2440					2445			
Asp	Gly	Leu	Ser	Glu	Lys	Leu	Arg	Val	Thr	Leu	Gln	Val	Ser	Asp
	2450					2455					2460			
Gly	Glu	Ser	Val	Asp	Pro	Thr	Ile	Pro	Leu	Ile	Asp	Gln	Gly	Val
	2465					2470					2475			
Asp	Ser	Leu	Gly	Ala	Val	Thr	Val	Gly	Ser	Trp	Phe	Ser	Lys	Gln
	2480					2485					2490			
Leu	Tyr	Leu	Asp	Leu	Pro	Leu	Leu	Arg	Val	Leu	Gly	Gly	Ala	Ser
	2495					2500					2505			
Val	Ala	Asp	Leu	Ala	Asp	Asp	Ala	Ala	Thr	Arg	Leu	Pro	Ala	Thr
	2510					2515					2520			
Ser	Ile	Pro	Leu	Leu	Leu	Gln	Ile	Gly	Asp	Ser	Thr	Gly	Thr	Ser
	2525					2530					2535			
Asp	Ser	Gly	Ala	Ser	Pro	Thr	Pro	Thr	Asp	Ser	His	Asp	Glu	Ala
	2540					2545					2550			
Ser	Ser	Ala	Thr	Ser	Thr	Asp	Ala	Ser	Ser	Ala	Glu	Glu	Asp	Glu
	2555					2560					2565			

Glu	Gln	Glu	Asp	Asp	Asn	Glu	Gln	Gly	Gly	Arg	Lys	Ile	Leu	Arg
2570						2575					2580			
Arg	Glu	Arg	Leu	Ser	Leu	Gly	Gln	Glu	Tyr	Ser	Trp	Arg	Gln	Gln
2585						2590					2595			
Gln	Met	Val	Lys	Asp	His	Thr	Ile	Phe	Asn	Asn	Thr	Ile	Gly	Met
2600						2605					2610			
Phe	Met	Lys	Gly	Thr	Ile	Asp	Leu	Asp	Arg	Leu	Arg	Arg	Ala	Leu
2615						2620					2625			
Lys	Ala	Ser	Leu	Arg	Arg	His	Glu	Ile	Phe	Arg	Thr	Cys	Phe	Val
2630						2635					2640			
Thr	Gly	Asp	Asp	Tyr	Ser	Ser	Asp	Leu	Asn	Gly	Pro	Val	Gln	Val
2645						2650					2655			
Val	Leu	Lys	Asn	Pro	Glu	Asn	Arg	Val	His	Phe	Val	Gln	Val	Asn
2660						2665					2670			
Asn	Ala	Ala	Glu	Ala	Glu	Glu	Glu	Tyr	Arg	Lys	Leu	Glu	Lys	Thr
2675						2680					2685			
Asn	Tyr	Ser	Ile	Ser	Thr	Gly	Asp	Thr	Leu	Arg	Leu	Val	Asp	Phe
2690						2695					2700			
Tyr	Trp	Gly	Thr	Asp	Asp	His	Leu	Leu	Val	Ile	Gly	Tyr	His	Arg
2705						2710					2715			
Leu	Val	Gly	Asp	Gly	Ser	Thr	Thr	Glu	Asn	Leu	Phe	Asn	Glu	Ile
2720						2725					2730			
Gly	Gln	Ile	Tyr	Ser	Gly	Val	Lys	Met	Gln	Arg	Pro	Ser	Thr	Gln
2735						2740					2745			
Phe	Ser	Asp	Leu	Ala	Val	Gln	Gln	Arg	Glu	Asn	Leu	Glu	Asn	Gly

2750	2755	2760
Arg Met Gly Asp Asp Ile Ala Phe Trp Lys Ser Met His Ser Lys 2765 2770 2775		
Val Ser Ser Ser Ala Pro Thr Val Leu Pro Ile Met Asn Leu Ile 2780 2785 2790		
Asn Asp Pro Ala Ala Asn Ser Glu Gln Gln Gln Ile Gln Pro Phe 2795 2800 2805		
Thr Trp Gln Gln Tyr Glu Ala Ile Ala Arg Leu Asp Pro Met Val 2810 2815 2820		
Ala Phe Arg Ile Lys Glu Arg Ser Arg Lys His Lys Ala Thr Pro 2825 2830 2835		
Met Gln Phe Tyr Leu Ala Ala Tyr His Val Leu Leu Ala Arg Leu 2840 2845 2850		
Thr Gly Ser Lys Asp Ile Thr Ile Gly Leu Ala Glu Thr Asn Arg 2855 2860 2865		
Ser Thr Met Glu Glu Ile Ser Ala Met Gly Phe Phe Ala Asn Val 2870 2875 2880		
Leu Pro Leu Arg Phe Asp Glu Phe Val Gly Ser Lys Thr Phe Gly 2885 2890 2895		
Glu His Leu Val Ala Thr Lys Asp Ser Val Arg Glu Ala Met Gln 2900 2905 2910		
His Ala Arg Val Pro Tyr Gly Val Ile Leu Asp Cys Leu Gly Leu 2915 2920 2925		
Asn Leu Pro Thr Ser Gly Glu Glu Pro Lys Thr Gln Thr His Ala 2930 2935 2940		

Pro Leu Phe Gln Ala Val Phe Asp Tyr Lys Gln Gly Gln Ala Glu
2945 2950 2955

Ser Gly Ser Ile Gly Asn Ala Lys Met Thr Ser Val Leu Ala Ser
2960 2965 2970

Arg Glu Arg Thr Pro Tyr Asp Ile Val Leu Glu Met Trp Asp Asp
2975 2980 2985

Pro Thr Lys Asp Pro Leu Ile His Val Lys Leu Gln Ser Ser Leu
2990 2995 3000

Tyr Gly Pro Glu His Ala Gln Ala Phe Val Asp His Phe Ser Ser
3005 3010 3015

Ile Leu Thr Met Phe Ser Met Asn Pro Ala Leu Lys Leu Ala
3020 3025 3030

<210> 45

<211> 7692

<212> DNA

<213> Penicillium citrinum

<220>

<221> CDS

<222> (1)..(7692)

<400> 45

atg aac aat acc ccc gcc gta acc gca acc gca acc gca acc
48

Met Asn Asn Thr Pro Ala Val Thr Ala Thr Ala Thr Ala Thr

1

5

10

15

gca acc gca atg gca ggc tcg gct tgc tct aac aca tcc acg ccc att
96
Ala Thr Ala Met Ala Gly Ser Ala Cys Ser Asn Thr Ser Thr Pro Ile

20

25

30

gcc ata gtt gga atg gga tgt cga ttt gct gga gat gca acg agt cca
144
Ala Ile Val Gly Met Gly Cys Arg Phe Ala Gly Asp Ala Thr Ser Pro

35

40

45

cag aag ctt tgg gaa atg gtt gaa aga gga ggc agt gcc tgg tct aag
192
Gln Lys Leu Trp Glu Met Val Glu Arg Gly Gly Ser Ala Trp Ser Lys

50

55

60

gtc ccc tcc tcg cga ttc aat gtg aga gga gta tac cac ccg aat ggc
240
Val Pro Ser Ser Arg Phe Asn Val Arg Gly Val Tyr His Pro Asn Gly

65

70

75

80

gaa agg gtc ggg tcc acc cac gta aag ggt gga cac ttc atc gac gag
288
Glu Arg Val Gly Ser Thr His Val Lys Gly Gly His Phe Ile Asp Glu

85

90

95

gat cct gct tta ttt gac gcc gcg ttc ttc aac atg acc aca gag gtc
336
Asp Pro Ala Leu Phe Asp Ala Ala Phe Phe Asn Met Thr Thr Glu Val

100

105

110

gcc agc tgc atg gat ccg cag tat cgg ctt atg ctt gag gtg gtc tac
384
Ala Ser Cys Met Asp Pro Gln Tyr Arg Leu Met Leu Glu Val Val Tyr

115

120

125

gaa tcg ctg gag agt gcc ggt atc acc atc gat ggt atg gca ggc tct

432
 Glu Ser Leu Glu Ser Ala Gly Ile Thr Ile Asp Gly Met Ala Gly Ser
 130 135 140

 aat acg tcg gtg ttt ggg ggt gtc atg tac cac gac tat cag gat tcg
 480
 Asn Thr Ser Val Phe Gly Gly Val Met Tyr His Asp Tyr Gln Asp Ser
 145 150 155 160

 ctc aat cgt gac ccc gag aca gtt ccg cgt tat ttc ata act ggc aac
 528
 Leu Asn Arg Asp Pro Glu Thr Val Pro Arg Tyr Phe Ile Thr Gly Asn
 165 170 175

 tca gga aca atg ctt tcg aac cgg ata tca cac ttc tac gac tta cgt
 576
 Ser Gly Thr Met Leu Ser Asn Arg Ile Ser His Phe Tyr Asp Leu Arg
 180 185 190

 ggt ccc agc gtg acg gtt gac acg gcc tgt tcg acg aca ttg acc gca
 624
 Gly Pro Ser Val Thr Val Asp Thr Ala Cys Ser Thr Thr Leu Thr Ala
 195 200 205

 ctg cac ttg gcg tgc cag agc tta cgt act ggg gag tca gat aca gcc
 672
 Leu His Leu Ala Cys Gln Ser Leu Arg Thr Gly Glu Ser Asp Thr Ala
 210 215 220

 atc gtt atc ggt gca aat ctt ctg ctc aat ccc gat gtt ttt gtt acg
 720
 Ile Val Ile Gly Ala Asn Leu Leu Leu Asn Pro Asp Val Phe Val Thr
 225 230 235 240

 atg tca aac ctg gga ttt ttg tcc ccg gat ggt atc tcg tac tct ttt
 768

Met Ser Asn Leu Gly Phe Leu Ser Pro Asp Gly Ile Ser Tyr Ser Phe
245 250 255

gat cct cga gcg aat gga tat ggt cgc ggg gaa gga att gcc gct ctg
816
Asp Pro Arg Ala Asn Gly Tyr Gly Arg Gly Glu Gly Ile Ala Ala Leu
260 265 270

gta ata aag gcc ctc cct aac gcg ttg cga gac caa gac cct atc cga
864
Val Ile Lys Ala Leu Pro Asn Ala Leu Arg Asp Gln Asp Pro Ile Arg
275 280 285

gcc gtc att cga gag aca gcg ctg aac cag gat ggc aaa aca ccc gca
912
Ala Val Ile Arg Glu Thr Ala Leu Asn Gln Asp Gly Lys Thr Pro Ala
290 295 300

att act gcg ccg agt gat gtg gcg cag aaa agt ctg atc cag gag tgt
960
Ile Thr Ala Pro Ser Asp Val Ala Gln Lys Ser Leu Ile Gln Glu Cys
305 310 315 320

tac gat aag gct ggg cta gat atg tcg ttg acc tcg tac gtg gag gcc
1008
Tyr Asp Lys Ala Gly Leu Asp Met Ser Leu Thr Ser Tyr Val Glu Ala
325 330 335

cac gga act gga aca cca act ggt gac ccc ctt gaa atc tca gca att
1056
His Gly Thr Gly Thr Pro Thr Gly Asp Pro Leu Glu Ile Ser Ala Ile
340 345 350

tca gca gct ttt aaa gga cat cct ctg cac ctt ggc tct gtg aaa gca
1104
Ser Ala Ala Phe Lys Gly His Pro Leu His Leu Gly Ser Val Lys Ala

355	360	365
aat att ggc cat aca gaa gcc gcc agt ggc ctg gcc agt ata atc aag 1152		
Asn Ile Gly His Thr Glu Ala Ala Ser Gly Leu Ala Ser Ile Ile Lys		
370	375	380
gtg gcc ttg gcc ttg gag aag ggc ttg att ccc cct aat gcg cgg ttc 1200		
Val Ala Leu Ala Leu Glu Lys Gly Leu Ile Pro Pro Asn Ala Arg Phe		
385	390	395
ctg caa aag aac agc aag ctg atg ctt gac caa aag aac atc aag atc 1248		
Leu Gln Lys Asn Ser Lys Leu Met Leu Asp Gln Lys Asn Ile Lys Ile		
405	410	415
ccc atg tct gct caa gac tgg cct gtg aaa gat ggg act cgt cgc gca 1296		
Pro Met Ser Ala Gln Asp Trp Pro Val Lys Asp Gly Thr Arg Arg Ala		
420	425	430
tct gtc aat aac ttc ggc ttt ggt ggt tcg aat gct cac gtc att ttg 1344		
Ser Val Asn Asn Phe Gly Phe Gly Gly Ser Asn Ala His Val Ile Leu		
435	440	445
gaa tca tat gat cgc gca tca ttg gcc ctg cca gag gat caa gtg cat 1392		
Glu Ser Tyr Asp Arg Ala Ser Leu Ala Leu Pro Glu Asp Gln Val His		
450	455	460
gtc aat ggt aac tct gag cat ggt agg gtt gag gat ggt tcc aaa cag 1440		
Val Asn Gly Asn Ser Glu His Gly Arg Val Glu Asp Gly Ser Lys Gln		

465	470	475	480
agc cgc ata tac gtt gtg cgt gcc aag gac gag caa gct tgt cgg cga			
1488			
Ser Arg Ile Tyr Val Val Arg Ala Lys Asp Glu Gln Ala Cys Arg Arg			
	485	490	495
acg ata gca agc ctg cga gac tac att aaa tcc gtc gct gac att gac			
1536			
Thr Ile Ala Ser Leu Arg Asp Tyr Ile Lys Ser Val Ala Asp Ile Asp			
	500	505	510
ggg gaa ccc ttc ctc gcc agc ctc gcc tat aca cta ggc tct cgc cgt			
1584			
Gly Glu Pro Phe Leu Ala Ser Leu Ala Tyr Thr Leu Gly Ser Arg Arg			
	515	520	525
tcc att ctg cca tgg acg tca gtg tat gta gca gac agc ctt ggc ggc			
1632			
Ser Ile Leu Pro Trp Thr Ser Val Tyr Val Ala Asp Ser Leu Gly Gly			
	530	535	540
ctt gtt tct gcc ctc agc gat gag tcc aat caa cca aaa cga gcg aat			
1680			
Leu Val Ser Ala Leu Ser Asp Glu Ser Asn Gln Pro Lys Arg Ala Asn			
545	550	555	560
gag aaa gta cgg ctc gga ttt gta ttc acc ggt cag ggg gcg cag tgg			
1728			
Glu Lys Val Arg Leu Gly Phe Val Phe Thr Gly Gln Gly Ala Gln Trp			
	565	570	575
cat gca atg ggc aga gag ctg gtc aat aca ttc cca gta ttc aaa cag			
1776			
His Ala Met Gly Arg Glu Leu Val Asn Thr Phe Pro Val Phe Lys Gln			
	580	585	590

gcg att ctt gaa tgt gat ggc tac atc aag caa ctg ggc gcg agt tgg
1824

Ala Ile Leu Glu Cys Asp Gly Tyr Ile Lys Gln Leu Gly Ala Ser Trp

595

600

605

aat ttt atg gag gag ctc cac cgt gat gag ctg acg act cgg gta aat
1872

Asn Phe Met Glu Glu Leu His Arg Asp Glu Leu Thr Thr Arg Val Asn

610

615

620

gat gcc gaa tac agt cta cca ctg tca acc gct atc caa att gca ctt
1920

Asp Ala Glu Tyr Ser Leu Pro Leu Ser Thr Ala Ile Gln Ile Ala Leu

625

630

635

640

gtg cgt ctc ctt tgg tca tgg gga att cgg cca acg ggg ata acc agt
1968

Val Arg Leu Leu Trp Ser Trp Gly Ile Arg Pro Thr Gly Ile Thr Ser

645

650

655

cac tca agt gga gag gct gct gct gcc tac gca gct ggg gct tta tcc
2016

His Ser Ser Gly Glu Ala Ala Ala Tyr Ala Ala Gly Ala Leu Ser

660

665

670

gcg cgg tcg gcc att ggg atc act tat ata cgc ggt gta ttg acc act
2064

Ala Arg Ser Ala Ile Gly Ile Thr Tyr Ile Arg Gly Val Leu Thr Thr

675

680

685

aag ccc aag ccc gca ttg gca gcc aaa gga gga atg atg gcg gtg ggt
2112

Lys Pro Lys Pro Ala Leu Ala Ala Lys Gly Gly Met Met Ala Val Gly

690

695

700

ctt ggt cgc agt gag acc aat gtt tac att tcg cgt ctc aac cag gag
2160

Leu Gly Arg Ser Glu Thr Asn Val Tyr Ile Ser Arg Leu Asn Gln Glu

705

710

715

720

gac ggc tgt gtg gtg gtt gga tgt atc aac agt caa tgt agt gtg acg
2208

Asp Gly Cys Val Val Val Gly Cys Ile Asn Ser Gln Cys Ser Val Thr

725

730

735

gtg tcg gga gat ttg ggt gca atc gag aaa ctt gaa aag ttg tta cac
2256

Val Ser Gly Asp Leu Gly Ala Ile Glu Lys Leu Glu Lys Leu Leu His

740

745

750

gcc gat ggc atc ttt acc agg aaa ctg aaa gtc act gaa gcc ttc cat
2304

Ala Asp Gly Ile Phe Thr Arg Lys Leu Lys Val Thr Glu Ala Phe His

755

760

765

tca agc cac atg cga cca atg gca gat gcc ttt ggg gcg tca ctg aga
2352

Ser Ser His Met Arg Pro Met Ala Asp Ala Phe Gly Ala Ser Leu Arg

770

775

780

gat ctg ttc aac tcg gat aac aac aac gac aat ccc aat gct gac acc
2400

Asp Leu Phe Asn Ser Asp Asn Asn Asn Asp Asn Pro Asn Ala Asp Thr

785

790

795

800

tca aag ggt gta tta tat tca tca cct aag act ggt agt cgc atg acc
2448

Ser Lys Gly Val Leu Tyr Ser Ser Pro Lys Thr Gly Ser Arg Met Thr

805

810

815

gat ctt aaa ttg cta ttg gat ccc aca cac tgg atg gat agt atg cta

2496
 Asp Leu Lys Leu Leu Leu Asp Pro Thr His Trp Met Asp Ser Met Leu
 820 825 830

cag ccg gta gag ttc gag tcc tca ctc cgc gag atg tgc ttt gat ccc
 2544
 Gln Pro Val Glu Phe Glu Ser Ser Leu Arg Glu Met Cys Phe Asp Pro
 835 840 845

aac acc aaa gag aaa gcc gtc gat gtg att att gaa ata ggg cct cac
 2592
 Asn Thr Lys Glu Lys Ala Val Asp Val Ile Ile Glu Ile Gly Pro His
 850 855 860

gga gcg ctt ggt ggt cca atc aac caa gtc atg cag gat ctg ggt ctg
 2640
 Gly Ala Leu Gly Gly Pro Ile Asn Gln Val Met Gln Asp Leu Gly Leu
 865 870 875 880

aaa gga aca gat ata aac tat ctc agt tgc ctt tct cgc ggc aga agc
 2688
 Lys Gly Thr Asp Ile Asn Tyr Leu Ser Cys Leu Ser Arg Gly Arg Ser
 885 890 895

tcg ttg gag aca atg tat cgt gct gct acg gag ttg ata agc aag ggt
 2736
 Ser Leu Glu Thr Met Tyr Arg Ala Ala Thr Glu Leu Ile Ser Lys Gly
 900 905 910

tat ggg ctc aaa atg gac gct ata aac ttt cct cat gga aga aaa gag
 2784
 Tyr Gly Leu Lys Met Asp Ala Ile Asn Phe Pro His Gly Arg Lys Glu
 915 920 925

ccc aga gtg aag gta ctg agc gat ttg ccg gcg tac ccg tgg aat cac
 2832

Pro Arg Val Lys Val Leu Ser Asp Leu Pro Ala Tyr Pro Trp Asn His
930 935 940

caa acc cgt tat tgg aga gag cct cgc ggc agt cgt gag tcc aaa cag
2880
Gln Thr Arg Tyr Trp Arg Glu Pro Arg Gly Ser Arg Glu Ser Lys Gln
945 950 955 960

aga acc cat ccg cct cac act ttg ata ggc tca cgg gaa tct ctc tct
2928
Arg Thr His Pro Pro His Thr Leu Ile Gly Ser Arg Glu Ser Leu Ser
965 970 975

cct cat ttc gcg cct aaa tgg aaa cat gtt ctc cgt ctg tca gat att
2976
Pro His Phe Ala Pro Lys Trp Lys His Val Leu Arg Leu Ser Asp Ile
980 985 990

cca tgg ata cga gat cac gtc gtt ggt tcg agc atc atc ttt ccg gga
3024
Pro Trp Ile Arg Asp His Val Val Gly Ser Ser Ile Ile Phe Pro Gly
995 1000 1005

gct ggc ttc atc agc atg gcc atc gag ggg ttt tca caa gtc tgc
3069
Ala Gly Phe Ile Ser Met Ala Ile Glu Gly Phe Ser Gln Val Cys
1010 1015 1020

cca cca gtt gcg ggg gct agc atc aac tac aac ttg cgt gac gtt
3114
Pro Pro Val Ala Gly Ala Ser Ile Asn Tyr Asn Leu Arg Asp Val
1025 1030 1035

gaa ctc gcg cag gct ctc ata ata ccc gct gat gca gaa gca gag
3159
Glu Leu Ala Gln Ala Leu Ile Ile Pro Ala Asp Ala Glu Ala Glu

1040	1045	1050
gtt gac ctg cgc cta acg atc cgt tca tgt gag gaa agg tcc ctc 3204		
Val Asp Leu Arg Leu Thr Ile Arg Ser Cys Glu Glu Arg Ser Leu		
1055	1060	1065
ggc aca aag aac tgg cat caa ttt tct gtg cac tca att tcg ggc 3249		
Gly Thr Lys Asn Trp His Gln Phe Ser Val His Ser Ile Ser Gly		
1070	1075	1080
gaa aat aat acc tgg aca gaa cac tgc acc gga tta ata cgt tcg 3294		
Glu Asn Asn Thr Trp Thr Glu His Cys Thr Gly Leu Ile Arg Ser		
1085	1090	1095
gag agc gaa aga agc cac ctt gac tgt tca act gtg gaa gcc tca 3339		
Glu Ser Glu Arg Ser His Leu Asp Cys Ser Thr Val Glu Ala Ser		
1100	1105	1110
cgc agg ttg aat cta ggc tca gat aac cgg agc att gat ccc aac 3384		
Arg Arg Leu Asn Leu Gly Ser Asp Asn Arg Ser Ile Asp Pro Asn		
1115	1120	1125
gat ctc tgg gag tcc tta cac gcg aat ggg ata tgc cac gga ccc 3429		
Asp Leu Trp Glu Ser Leu His Ala Asn Gly Ile Cys His Gly Pro		
1130	1135	1140
att ttt cag aac att cag cga att caa aac aat gga cag ggc tcg 3474		
Ile Phe Gln Asn Ile Gln Arg Ile Gln Asn Asn Gly Gln Gly Ser		

1145	1150	1155
ttt tgc aga ttt tcc att gct gac act gcc tcg gct atg cct cac 3519		
Phe Cys Arg Phe Ser Ile Ala Asp Thr Ala Ser Ala Met Pro His		
1160	1165	1170
tcg tac gag aat cga cac atc gtc cat cct act act ctg gac tcg 3564		
Ser Tyr Glu Asn Arg His Ile Val His Pro Thr Thr Leu Asp Ser		
1175	1180	1185
gtg atc cag gcg gca tac acg gtg tta ccc tac gcg gga aca cgt 3609		
Val Ile Gln Ala Ala Tyr Thr Val Leu Pro Tyr Ala Gly Thr Arg		
1190	1195	1200
atg aaa acg gcc atg gta cca agg agg cta aga aat gtc aaa ata 3654		
Met Lys Thr Ala Met Val Pro Arg Arg Leu Arg Asn Val Lys Ile		
1205	1210	1215
tcc tct agc ctg gct gac ttg gag gct ggt gat gct ctg gac gca 3699		
Ser Ser Ser Leu Ala Asp Leu Glu Ala Gly Asp Ala Leu Asp Ala		
1220	1225	1230
cag gcc agc atc aag gat cgc aac tct caa tcc ttc tct acc gac 3744		
Gln Ala Ser Ile Lys Asp Arg Asn Ser Gln Ser Phe Ser Thr Asp		
1235	1240	1245
ttg gca gtg ttt gat gac tat gat agc ggt tct tct ccc tcg gac 3789		
Leu Ala Val Phe Asp Asp Tyr Asp Ser Gly Ser Ser Pro Ser Asp		
1250	1255	1260

gga atc cca gtc ata gag att gaa ggc ctt gtt ttc cag tcg gtt
3834
Gly Ile Pro Val Ile Glu Ile Glu Gly Leu Val Phe Gln Ser Val

1265

1270

1275

gga agc agc ttc tct gac caa aag tca gac tcc aac gac aca gaa
3879
Gly Ser Ser Phe Ser Asp Gln Lys Ser Asp Ser Asn Asp Thr Glu

1280

1285

1290

aat gcc tgc agc tcc tgg gtt tgg gcc cct gac atc agc ttg ggt
3924
Asn Ala Cys Ser Ser Trp Val Trp Ala Pro Asp Ile Ser Leu Gly

1295

1300

1305

gac tcc act tgg ctc aaa gaa aag ttg agc act gag gct gag acg
3969
Asp Ser Thr Trp Leu Lys Glu Lys Leu Ser Thr Glu Ala Glu Thr

1310

1315

1320

aaa gaa acg gaa ctc atg atg gac ctc cga aga tgc acg atc aac
4014
Lys Glu Thr Glu Leu Met Met Asp Leu Arg Arg Cys Thr Ile Asn

1325

1330

1335

ttt ata cag gag gct gtc act gat ttg aca aat tct gat atc caa
4059
Phe Ile Gln Glu Ala Val Thr Asp Leu Thr Asn Ser Asp Ile Gln

1340

1345

1350

cat ctg gat ggc cac ctt cag aag tat ttc gat tgg atg aat gtc
4104
His Leu Asp Gly His Leu Gln Lys Tyr Phe Asp Trp Met Asn Val

1355

1360

1365

caa ttg gac ctt gcg aga caa aac aag ctc agc cca gcc agt tgc
 4149
 Gln Leu Asp Leu Ala Arg Gln Asn Lys Leu Ser Pro Ala Ser Cys
 1370 1375 1380

gac tgg cta agt gac gat gct gag cag aag aaa tgc cta cag gcc
 4194
 Asp Trp Leu Ser Asp Asp Ala Glu Gln Lys Lys Cys Leu Gln Ala
 1385 1390 1395

aga gtc gct gga gaa agc gtc aat ggc gag atg att tct cgt cta
 4239
 Arg Val Ala Gly Glu Ser Val Asn Gly Glu Met Ile Ser Arg Leu
 1400 1405 1410

gga cct cag tta ata gca atg cta cgc cgc gaa aca gag cca ctt
 4284
 Gly Pro Gln Leu Ile Ala Met Leu Arg Arg Glu Thr Glu Pro Leu
 1415 1420 1425

gag ttg atg atg caa gat cag ctg cta agc aga tac tac gtc aac
 4329
 Glu Leu Met Met Gln Asp Gln Leu Leu Ser Arg Tyr Tyr Val Asn
 1430 1435 1440

gca atc aaa tgg agc cga tca aac gca caa gcc agc gag ctg atc
 4374
 Ala Ile Lys Trp Ser Arg Ser Asn Ala Gln Ala Ser Glu Leu Ile
 1445 1450 1455

cga ctt tgc gcc cac aag aac ccg cgt tct cgc att ttg gag att
 4419
 Arg Leu Cys Ala His Lys Asn Pro Arg Ser Arg Ile Leu Glu Ile
 1460 1465 1470

ggc gga ggc acg ggc ggc tgc aca aag ctt att gtc aat gca ttg

4464
 Gly Gly Gly Thr Gly Gly Cys Thr Lys Leu Ile Val Asn Ala Leu
 1475 1480 1485

gga aac acc aag ccg atc gat cgt tat gac ttc acc gat gtg tct
 4509
 Gly Asn Thr Lys Pro Ile Asp Arg Tyr Asp Phe Thr Asp Val Ser
 1490 1495 1500

gcc ggg ttt ttc gag tcg gcg cgt gag caa ttt gcg gat tgg caa
 4554
 Ala Gly Phe Phe Glu Ser Ala Arg Glu Gln Phe Ala Asp Trp Gln
 1505 1510 1515

gac gtg atg act ttc aaa aaa ttg gat att gaa agc gat ccc gag
 4599
 Asp Val Met Thr Phe Lys Lys Leu Asp Ile Glu Ser Asp Pro Glu
 1520 1525 1530

caa caa ggg ttt gaa tgt gcc acc tac gat gtg gtc gtg gct tgc
 4644
 Gln Gln Gly Phe Glu Cys Ala Thr Tyr Asp Val Val Val Ala Cys
 1535 1540 1545

cag gtc ctg cat gca act cga tgc atg aaa cga aca ctg agt aac
 4689
 Gln Val Leu His Ala Thr Arg Cys Met Lys Arg Thr Leu Ser Asn
 1550 1555 1560

gtt cga aaa ttg ctc aag cct ggg ggc aac ttg att ttg gtt gag
 4734
 Val Arg Lys Leu Leu Lys Pro Gly Gly Asn Leu Ile Leu Val Glu
 1565 1570 1575

act acc agg gat cag ctc gat ttg ttc ttt acc ttc gga ctg ttg
 4779

Thr Thr	Arg Asp Gln Leu Asp	Leu Phe Phe Thr Phe	Gly Leu Leu
1580	1585	1590	

cca ggt 4824	tgg tgg ctc agt gag	gag cct gag cgg aag	tcg acg cca
Pro Gly	Trp Trp Leu Ser Glu	Glu Pro Glu Arg Lys	Ser Thr Pro
1595	1600	1605	

tcg ctc 4869	act acc gat ctt tgg	aac acc atg ttg gac	acg agc ggt
Ser Leu	Thr Thr Asp Leu Trp	Asn Thr Met Leu Asp	Thr Ser Gly
1610	1615	1620	

ttc aac 4914	ggc gtg gaa ttg gag	gtt cgt gat tgt gaa	gac gat gag
Phe Asn	Gly Val Glu Leu Glu	Val Arg Asp Cys Glu	Asp Asp Glu
1625	1630	1635	

ttt tac 4959	atg atc agc aca atg	cta tcg acg gct aga	aaa gag aat
Phe Tyr	Met Ile Ser Thr Met	Leu Ser Thr Ala Arg	Lys Glu Asn
1640	1645	1650	

aca acc 5004	ccg gat aca gtg gca	gaa tcg gag gtg ctt	ttg ctg cac
Thr Thr	Pro Asp Thr Val Ala	Glu Ser Glu Val Leu	Leu Leu His
1655	1660	1665	

gga gcg 5049	ctc cga cct cct tca	tct tgg ctg gaa agt	ctc cag gca
Gly Ala	Leu Arg Pro Pro Ser	Ser Trp Leu Glu Ser	Leu Gln Ala
1670	1675	1680	

gca att 5094	tgt gaa aag acc agt	tct agc cca tcg atc	aac gct ctg
Ala Ile	Cys Glu Lys Thr Ser	Ser Ser Pro Ser Ile	Asn Ala Leu

1685	1690	1695
ggc gag gta gat acc act gga agg aca tgc att ttt ctt ggg gaa 5139		
Gly Glu Val Asp Thr Thr Gly Arg Thr Cys Ile Phe Leu Gly Glu		
1700	1705	1710
atg gag tcc tcg ctc ctt gga gag gtg gga agc gag acc ttc aaa 5184		
Met Glu Ser Ser Leu Leu Gly Glu Val Gly Ser Glu Thr Phe Lys		
1715	1720	1725
tcc atc acc gcg atg ctg aat aac tgc aac gca ctt ctc tgg gtg 5229		
Ser Ile Thr Ala Met Leu Asn Asn Cys Asn Ala Leu Leu Trp Val		
1730	1735	1740
tct aga gga gca gcc atg agc tcc gag gat cca tgg aaa gct cta 5274		
Ser Arg Gly Ala Ala Met Ser Ser Glu Asp Pro Trp Lys Ala Leu		
1745	1750	1755
cat att ggt ctg ctg cgt acc atc cgc aac gaa aat aac ggg aag 5319		
His Ile Gly Leu Leu Arg Thr Ile Arg Asn Glu Asn Asn Gly Lys		
1760	1765	1770
gaa tat gta tcg ttg gat ctc gat cct tct cga aac gca tac acc 5364		
Glu Tyr Val Ser Leu Asp Leu Asp Pro Ser Arg Asn Ala Tyr Thr		
1775	1780	1785
cac gag tcc ctg tat gct atc tgc aat atc ttc aat ggc cgc ctc 5409		
His Glu Ser Leu Tyr Ala Ile Cys Asn Ile Phe Asn Gly Arg Leu		

1790	1795	1800
ggc gac ctt tcc gaa gac aag 5454	gag ttt gaa ttt gca	gag aga aac
Gly Asp Leu Ser Glu Asp Lys	Glu Phe Glu Phe Ala	Glu Arg Asn
1805	1810	1815
ggc gtc atc cac gta ccg cga 5499	ctt ttc aat gac ccg	cac tgg aag
Gly Val Ile His Val Pro Arg	Leu Phe Asn Asp Pro	His Trp Lys
1820	1825	1830
gac caa gaa gcg gtt gag gtc 5544	aca ctg cag ccg ttc	gag caa ccc
Asp Gln Glu Ala Val Glu Val	Thr Leu Gln Pro Phe	Glu Gln Pro
1835	1840	1845
ggg cgt cgt ctg cgg atg gag 5589	gtt gag acg cca ggg	ctc tta gac
Gly Arg Arg Leu Arg Met Glu	Val Glu Thr Pro Gly	Leu Leu Asp
1850	1855	1860
tcc ctg caa ttt cga gac gac 5634	gaa gga cgt gaa ggc	aag gat ctt
Ser Leu Gln Phe Arg Asp Asp	Glu Gly Arg Glu Gly	Lys Asp Leu
1865	1870	1875
ccg gat gat tgg gta gaa atc 5679	gaa ccc aaa gct ttc	ggt ctc aat
Pro Asp Asp Trp Val Glu Ile	Glu Pro Lys Ala Phe	Gly Leu Asn
1880	1885	1890
ttt cgg gat gtc atg gtt gcc 5724	atg ggt caa ttg gag	gcc aac cgt
Phe Arg Asp Val Met Val Ala	Met Gly Gln Leu Glu	Ala Asn Arg
1895	1900	1905

gtg atg ggc ttc gaa tgc gcc gga gtg atc aca aag ctc ggt gga
 5769
 Val Met Gly Phe Glu Cys Ala Gly Val Ile Thr Lys Leu Gly Gly

1910

1915

1920

gct gct gcc gct agc caa ggc ctc aga tta ggg gac cgc gta tgt
 5814
 Ala Ala Ala Ala Ser Gln Gly Leu Arg Leu Gly Asp Arg Val Cys

1925

1930

1935

gca cta ctg aaa ggc cat tgg gcg acc aga aca cag acg ccg tac
 5859
 Ala Leu Leu Lys Gly His Trp Ala Thr Arg Thr Gln Thr Pro Tyr

1940

1945

1950

act aat gtc gtc cgt att ccg gac gaa atg ggc ttc cca gaa gcc
 5904
 Thr Asn Val Val Arg Ile Pro Asp Glu Met Gly Phe Pro Glu Ala

1955

1960

1965

gct tcg gtc ccc ctg gct ttc act acc gca tat att gcg ctt tat
 5949
 Ala Ser Val Pro Leu Ala Phe Thr Thr Ala Tyr Ile Ala Leu Tyr

1970

1975

1980

acc acg gca aag cta cga cga ggc gaa aga gtc ttg atc cac agt
 5994
 Thr Thr Ala Lys Leu Arg Arg Gly Glu Arg Val Leu Ile His Ser

1985

1990

1995

gga gct gga ggc gtc ggt caa gca gcg atc att ttg tcc cag ctt
 6039
 Gly Ala Gly Gly Val Gly Gln Ala Ala Ile Ile Leu Ser Gln Leu

2000

2005

2010

gcg ggt gcc gag gtc ttc gtc aca gcg gga act caa gcc aag cgt
6084
Ala Gly Ala Glu Val Phe Val Thr Ala Gly Thr Gln Ala Lys Arg

2015

2020

2025

gac ttt gtc ggc gat aaa ttc ggc atc aat ccg gat cat atc ttc
6129
Asp Phe Val Gly Asp Lys Phe Gly Ile Asn Pro Asp His Ile Phe

2030

2035

2040

tcg agc agg aat gac tta ttc gtc gac ggc atc aaa gcc tac acg
6174
Ser Ser Arg Asn Asp Leu Phe Val Asp Gly Ile Lys Ala Tyr Thr

2045

2050

2055

ggc gga ctt ggc gtt cat gtc gtt cta aac tca ttg gca ggt caa
6219
Gly Gly Leu Gly Val His Val Val Leu Asn Ser Leu Ala Gly Gln

2060

2065

2070

ctc ctc caa gca agc ttt gac tgc atg gcc gaa ttc ggc aga ttt
6264
Leu Leu Gln Ala Ser Phe Asp Cys Met Ala Glu Phe Gly Arg Phe

2075

2080

2085

gtt gag att gga aaa aag gac ctg gag caa aac agc aga ctt gac
6309
Val Glu Ile Gly Lys Lys Asp Leu Glu Gln Asn Ser Arg Leu Asp

2090

2095

2100

atg ctg cca ttc acc cgg gac gtc tct ttc aca tca att gat ctt
6354
Met Leu Pro Phe Thr Arg Asp Val Ser Phe Thr Ser Ile Asp Leu

2105

2110

2115

ctc tcg tgg caa aga gcc aaa agt gaa gaa gta tcc gaa gcg ttg

6399
 Leu Ser Trp Gln Arg Ala Lys Ser Glu Glu Val Ser Glu Ala Leu
 2120 2125 2130

aac cat gtc aca aaa ctc ctc gag aca aaa gcg att ggc ttg att
 6444
 Asn His Val Thr Lys Leu Leu Glu Thr Lys Ala Ile Gly Leu Ile
 2135 2140 2145

ggt cca atc cag cag cac tcc ttg tca aac atc gag aag gcc ttc
 6489
 Gly Pro Ile Gln Gln His Ser Leu Ser Asn Ile Glu Lys Ala Phe
 2150 2155 2160

cgt acg atg cag agt ggt cag cat gtt ggc aaa gtt gtg gtc aat
 6534
 Arg Thr Met Gln Ser Gly Gln His Val Gly Lys Val Val Val Asn
 2165 2170 2175

gta tct ggg gac gaa ctg gtc cca gtc ggc gat gga ggg ttc tcg
 6579
 Val Ser Gly Asp Glu Leu Val Pro Val Gly Asp Gly Gly Phe Ser
 2180 2185 2190

ctg aag ctg aag cct gac agt tct tac cta gtt gct ggt ggg ctg
 6624
 Leu Lys Leu Lys Pro Asp Ser Ser Tyr Leu Val Ala Gly Gly Leu
 2195 2200 2205

ggg gga att gga aag cag atc tgt cag tgg ctt gtt gat cat ggc
 6669
 Gly Gly Ile Gly Lys Gln Ile Cys Gln Trp Leu Val Asp His Gly
 2210 2215 2220

gcg aag cac ttg att atc cta tcg aga agt gca aag gcc agt cca
 6714

Ala	Lys	His	Leu	Ile	Ile	Leu	Ser	Arg	Ser	Ala	Lys	Ala	Ser	Pro
2225						2230					2235			
ttc	ata	acc	agc	ttg	caa	aat	caa	cag	tgc	gct	gtc	tat	cta	cac
6759														
Phe	Ile	Thr	Ser	Leu	Gln	Asn	Gln	Gln	Cys	Ala	Val	Tyr	Leu	His
2240						2245					2250			
gca	tgt	gac	atc	tca	gat	caa	gat	cag	gtc	acc	aag	gtg	ctc	cgg
6804														
Ala	Cys	Asp	Ile	Ser	Asp	Gln	Asp	Gln	Val	Thr	Lys	Val	Leu	Arg
2255						2260					2265			
ttg	tgc	gaa	gaa	gca	cat	gca	ccg	cca	att	cga	ggc	atc	ata	caa
6849														
Leu	Cys	Glu	Glu	Ala	His	Ala	Pro	Pro	Ile	Arg	Gly	Ile	Ile	Gln
2270						2275					2280			
ggc	gcc	atg	gtt	ctc	aag	gac	gcg	ctt	cta	tcg	cga	atg	aca	ttg
6894														
Gly	Ala	Met	Val	Leu	Lys	Asp	Ala	Leu	Leu	Ser	Arg	Met	Thr	Leu
2285						2290					2295			
gat	gaa	ttt	aat	gca	gca	aca	cgc	cca	aaa	gta	cag	ggc	agt	tgg
6939														
Asp	Glu	Phe	Asn	Ala	Ala	Thr	Arg	Pro	Lys	Val	Gln	Gly	Ser	Trp
2300						2305					2310			
tat	ctt	cac	aag	atc	gca	cag	gat	gtt	gac	ttc	ttc	gtg	atg	ctc
6984														
Tyr	Leu	His	Lys	Ile	Ala	Gln	Asp	Val	Asp	Phe	Phe	Val	Met	Leu
2315						2320					2325			
tca	tcc	ctt	gtt	ggg	gtc	atg	ggc	ggg	gca	ggc	cag	gcc	aat	tac
7029														
Ser	Ser	Leu	Val	Gly	Val	Met	Gly	Gly	Ala	Gly	Gln	Ala	Asn	Tyr

2330	2335	2340
gca gct gct ggt gca ttc cag gac gca ctt gcg cac cac cgg aga 7074		
Ala Ala Ala Gly Ala Phe Gln Asp Ala Leu Ala His His Arg Arg		
2345	2350	2355
gcc cat ggc atg ccg gct gtc acc att gac ttg ggc atg gtc aag 7119		
Ala His Gly Met Pro Ala Val Thr Ile Asp Leu Gly Met Val Lys		
2360	2365	2370
tct gtt gga tac gtg gct gaa act ggc cgt ggt gtg gcc gac cgg 7164		
Ser Val Gly Tyr Val Ala Glu Thr Gly Arg Gly Val Ala Asp Arg		
2375	2380	2385
ctc gct aga ata ggt tac aag cct atg cat gaa aag gac gtc atg 7209		
Leu Ala Arg Ile Gly Tyr Lys Pro Met His Glu Lys Asp Val Met		
2390	2395	2400
gat gtg ttg gag aag gca atc ctg tgt tct tcc cct caa ttt cca 7254		
Asp Val Leu Glu Lys Ala Ile Leu Cys Ser Ser Pro Gln Phe Pro		
2405	2410	2415
tca cct ccc gca gct gtg gtt aca gga atc aac aca tcc ccg ggt 7299		
Ser Pro Pro Ala Ala Val Val Thr Gly Ile Asn Thr Ser Pro Gly		
2420	2425	2430
gct cac tgg acc gag gca aac tgg ata cag gaa cag cgg ttt gtg 7344		
Ala His Trp Thr Glu Ala Asn Trp Ile Gln Glu Gln Arg Phe Val		

2435	2440	2445
gga ctt 7389	aaa tac cgc caa gtc	ctt cat gca gac caa tcc ttt gtc
Gly Leu	Lys Tyr Arg Gln Val	Leu His Ala Asp Gln Ser Phe Val
2450	2455	2460
tct tcg 7434	cat aaa aaa gga cca	gat ggc gtg cgg gcc caa cta agc
Ser Ser	His Lys Lys Gly Pro	Asp Gly Val Arg Ala Gln Leu Ser
2465	2470	2475
agg gtc 7479	acc tct cac gac gag	gcc att tct atc gtc ctc aaa gca
Arg Val	Thr Ser His Asp Glu	Ala Ile Ser Ile Val Leu Lys Ala
2480	2485	2490
atg acg 7524	gaa aag ctg atg cga	atg ttt ggt ctg gca gaa gac gac
Met Thr	Glu Lys Leu Met Arg	Met Phe Gly Leu Ala Glu Asp Asp
2495	2500	2505
atg tcc 7569	tcg tcc aaa aac ctg	gca ggt gtc ggc gta gac tca ctc
Met Ser	Ser Ser Lys Asn Leu	Ala Gly Val Gly Val Asp Ser Leu
2510	2515	2520
gtc gcc 7614	att gaa ctt cga aac	tgg atc aca tct gaa atc cat gtt
Val Ala	Ile Glu Leu Arg Asn	Trp Ile Thr Ser Glu Ile His Val
2525	2530	2535
gat gtg 7659	tcg atc ttt gag ctc	atg aat ggt aac acc atc gcc ggc
Asp Val	Ser Ile Phe Glu Leu	Met Asn Gly Asn Thr Ile Ala Gly
2540	2545	2550

ctc gtc gag tta gtt gtg gcg aaa tgc agt taa
7692
Leu Val Glu Leu Val Val Ala Lys Cys Ser

2555

2560

<210> 46

<211> 2563

<212> PRT

<213> Penicillium citrinum

<400> 46

Met Asn Asn Thr Pro Ala Val Thr Ala Thr Ala Thr Ala Thr Ala Thr
1 5 10 15

Ala Thr Ala Met Ala Gly Ser Ala Cys Ser Asn Thr Ser Thr Pro Ile
20 25 30

Ala Ile Val Gly Met Gly Cys Arg Phe Ala Gly Asp Ala Thr Ser Pro
35 40 45

Gln Lys Leu Trp Glu Met Val Glu Arg Gly Gly Ser Ala Trp Ser Lys
50 55 60

Val Pro Ser Ser Arg Phe Asn Val Arg Gly Val Tyr His Pro Asn Gly
65 70 75 80

Glu Arg Val Gly Ser Thr His Val Lys Gly Gly His Phe Ile Asp Glu
85 90 95

Asp Pro Ala Leu Phe Asp Ala Ala Phe Phe Asn Met Thr Thr Glu Val
100 105 110

Ala	Ser	Cys	Met	Asp	Pro	Gln	Tyr	Arg	Leu	Met	Leu	Glu	Val	Val	Tyr
		115					120					125			
Glu	Ser	Leu	Glu	Ser	Ala	Gly	Ile	Thr	Ile	Asp	Gly	Met	Ala	Gly	Ser
	130					135					140				
Asn	Thr	Ser	Val	Phe	Gly	Gly	Val	Met	Tyr	His	Asp	Tyr	Gln	Asp	Ser
145					150					155					160
Leu	Asn	Arg	Asp	Pro	Glu	Thr	Val	Pro	Arg	Tyr	Phe	Ile	Thr	Gly	Asn
				165					170					175	
Ser	Gly	Thr	Met	Leu	Ser	Asn	Arg	Ile	Ser	His	Phe	Tyr	Asp	Leu	Arg
			180					185					190		
Gly	Pro	Ser	Val	Thr	Val	Asp	Thr	Ala	Cys	Ser	Thr	Thr	Leu	Thr	Ala
		195					200					205			
Leu	His	Leu	Ala	Cys	Gln	Ser	Leu	Arg	Thr	Gly	Glu	Ser	Asp	Thr	Ala
	210					215					220				
Ile	Val	Ile	Gly	Ala	Asn	Leu	Leu	Leu	Asn	Pro	Asp	Val	Phe	Val	Thr
225					230					235					240
Met	Ser	Asn	Leu	Gly	Phe	Leu	Ser	Pro	Asp	Gly	Ile	Ser	Tyr	Ser	Phe
				245					250					255	
Asp	Pro	Arg	Ala	Asn	Gly	Tyr	Gly	Arg	Gly	Glu	Gly	Ile	Ala	Ala	Leu
			260					265					270		
Val	Ile	Lys	Ala	Leu	Pro	Asn	Ala	Leu	Arg	Asp	Gln	Asp	Pro	Ile	Arg
		275					280					285			
Ala	Val	Ile	Arg	Glu	Thr	Ala	Leu	Asn	Gln	Asp	Gly	Lys	Thr	Pro	Ala
	290					295					300				
Ile	Thr	Ala	Pro	Ser	Asp	Val	Ala	Gln	Lys	Ser	Leu	Ile	Gln	Glu	Cys
305					310					315					320

Tyr Asp Lys Ala Gly Leu Asp Met Ser Leu Thr Ser Tyr Val Glu Ala
325 330 335

His Gly Thr Gly Thr Pro Thr Gly Asp Pro Leu Glu Ile Ser Ala Ile
340 345 350

Ser Ala Ala Phe Lys Gly His Pro Leu His Leu Gly Ser Val Lys Ala
355 360 365

Asn Ile Gly His Thr Glu Ala Ala Ser Gly Leu Ala Ser Ile Ile Lys
370 375 380

Val Ala Leu Ala Leu Glu Lys Gly Leu Ile Pro Pro Asn Ala Arg Phe
385 390 395 400

Leu Gln Lys Asn Ser Lys Leu Met Leu Asp Gln Lys Asn Ile Lys Ile
405 410 415

Pro Met Ser Ala Gln Asp Trp Pro Val Lys Asp Gly Thr Arg Arg Ala
420 425 430

Ser Val Asn Asn Phe Gly Phe Gly Gly Ser Asn Ala His Val Ile Leu
435 440 445

Glu Ser Tyr Asp Arg Ala Ser Leu Ala Leu Pro Glu Asp Gln Val His
450 455 460

Val Asn Gly Asn Ser Glu His Gly Arg Val Glu Asp Gly Ser Lys Gln
465 470 475 480

Ser Arg Ile Tyr Val Val Arg Ala Lys Asp Glu Gln Ala Cys Arg Arg
485 490 495

Thr Ile Ala Ser Leu Arg Asp Tyr Ile Lys Ser Val Ala Asp Ile Asp
500 505 510

Gly Glu Pro Phe Leu Ala Ser Leu Ala Tyr Thr Leu Gly Ser Arg Arg

515					520					525					
Ser	Ile	Leu	Pro	Trp	Thr	Ser	Val	Tyr	Val	Ala	Asp	Ser	Leu	Gly	Gly
530						535					540				
Leu	Val	Ser	Ala	Leu	Ser	Asp	Glu	Ser	Asn	Gln	Pro	Lys	Arg	Ala	Asn
545					550					555					560
Glu	Lys	Val	Arg	Leu	Gly	Phe	Val	Phe	Thr	Gly	Gln	Gly	Ala	Gln	Trp
				565					570					575	
His	Ala	Met	Gly	Arg	Glu	Leu	Val	Asn	Thr	Phe	Pro	Val	Phe	Lys	Gln
			580					585					590		
Ala	Ile	Leu	Glu	Cys	Asp	Gly	Tyr	Ile	Lys	Gln	Leu	Gly	Ala	Ser	Trp
		595					600					605			
Asn	Phe	Met	Glu	Glu	Leu	His	Arg	Asp	Glu	Leu	Thr	Thr	Arg	Val	Asn
	610					615					620				
Asp	Ala	Glu	Tyr	Ser	Leu	Pro	Leu	Ser	Thr	Ala	Ile	Gln	Ile	Ala	Leu
625					630					635					640
Val	Arg	Leu	Leu	Trp	Ser	Trp	Gly	Ile	Arg	Pro	Thr	Gly	Ile	Thr	Ser
				645					650					655	
His	Ser	Ser	Gly	Glu	Ala	Ala	Ala	Ala	Tyr	Ala	Ala	Gly	Ala	Leu	Ser
			660					665					670		
Ala	Arg	Ser	Ala	Ile	Gly	Ile	Thr	Tyr	Ile	Arg	Gly	Val	Leu	Thr	Thr
		675					680					685			
Lys	Pro	Lys	Pro	Ala	Leu	Ala	Ala	Lys	Gly	Gly	Met	Met	Ala	Val	Gly
	690					695					700				
Leu	Gly	Arg	Ser	Glu	Thr	Asn	Val	Tyr	Ile	Ser	Arg	Leu	Asn	Gln	Glu
705					710					715					720

Asp	Gly	Cys	Val	Val	Val	Gly	Cys	Ile	Asn	Ser	Gln	Cys	Ser	Val	Thr
				725					730					735	
Val	Ser	Gly	Asp	Leu	Gly	Ala	Ile	Glu	Lys	Leu	Glu	Lys	Leu	Leu	His
			740					745					750		
Ala	Asp	Gly	Ile	Phe	Thr	Arg	Lys	Leu	Lys	Val	Thr	Glu	Ala	Phe	His
		755					760					765			
Ser	Ser	His	Met	Arg	Pro	Met	Ala	Asp	Ala	Phe	Gly	Ala	Ser	Leu	Arg
	770					775					780				
Asp	Leu	Phe	Asn	Ser	Asp	Asn	Asn	Asn	Asp	Asn	Pro	Asn	Ala	Asp	Thr
785					790					795					800
Ser	Lys	Gly	Val	Leu	Tyr	Ser	Ser	Pro	Lys	Thr	Gly	Ser	Arg	Met	Thr
				805					810					815	
Asp	Leu	Lys	Leu	Leu	Leu	Asp	Pro	Thr	His	Trp	Met	Asp	Ser	Met	Leu
			820					825					830		
Gln	Pro	Val	Glu	Phe	Glu	Ser	Ser	Leu	Arg	Glu	Met	Cys	Phe	Asp	Pro
		835					840					845			
Asn	Thr	Lys	Glu	Lys	Ala	Val	Asp	Val	Ile	Ile	Glu	Ile	Gly	Pro	His
	850					855					860				
Gly	Ala	Leu	Gly	Gly	Pro	Ile	Asn	Gln	Val	Met	Gln	Asp	Leu	Gly	Leu
865					870					875					880
Lys	Gly	Thr	Asp	Ile	Asn	Tyr	Leu	Ser	Cys	Leu	Ser	Arg	Gly	Arg	Ser
				885					890					895	
Ser	Leu	Glu	Thr	Met	Tyr	Arg	Ala	Ala	Thr	Glu	Leu	Ile	Ser	Lys	Gly
			900					905					910		
Tyr	Gly	Leu	Lys	Met	Asp	Ala	Ile	Asn	Phe	Pro	His	Gly	Arg	Lys	Glu
		915					920					925			

Pro Arg Val Lys Val Leu Ser Asp Leu Pro Ala Tyr Pro Trp Asn His
930 935 940

Gln Thr Arg Tyr Trp Arg Glu Pro Arg Gly Ser Arg Glu Ser Lys Gln
945 950 955 960

Arg Thr His Pro Pro His Thr Leu Ile Gly Ser Arg Glu Ser Leu Ser
965 970 975

Pro His Phe Ala Pro Lys Trp Lys His Val Leu Arg Leu Ser Asp Ile
980 985 990

Pro Trp Ile Arg Asp His Val Val Gly Ser Ser Ile Ile Phe Pro Gly
995 1000 1005

Ala Gly Phe Ile Ser Met Ala Ile Glu Gly Phe Ser Gln Val Cys
1010 1015 1020

Pro Pro Val Ala Gly Ala Ser Ile Asn Tyr Asn Leu Arg Asp Val
1025 1030 1035

Glu Leu Ala Gln Ala Leu Ile Ile Pro Ala Asp Ala Glu Ala Glu
1040 1045 1050

Val Asp Leu Arg Leu Thr Ile Arg Ser Cys Glu Glu Arg Ser Leu
1055 1060 1065

Gly Thr Lys Asn Trp His Gln Phe Ser Val His Ser Ile Ser Gly
1070 1075 1080

Glu Asn Asn Thr Trp Thr Glu His Cys Thr Gly Leu Ile Arg Ser
1085 1090 1095

Glu Ser Glu Arg Ser His Leu Asp Cys Ser Thr Val Glu Ala Ser
1100 1105 1110

Arg Arg Leu Asn Leu Gly Ser Asp Asn Arg Ser Ile Asp Pro Asn

1115						1120				1125				
Asp	Leu	Trp	Glu	Ser	Leu	His	Ala	Asn	Gly	Ile	Cys	His	Gly	Pro
1130						1135					1140			
Ile	Phe	Gln	Asn	Ile	Gln	Arg	Ile	Gln	Asn	Asn	Gly	Gln	Gly	Ser
1145						1150					1155			
Phe	Cys	Arg	Phe	Ser	Ile	Ala	Asp	Thr	Ala	Ser	Ala	Met	Pro	His
1160						1165					1170			
Ser	Tyr	Glu	Asn	Arg	His	Ile	Val	His	Pro	Thr	Thr	Leu	Asp	Ser
1175						1180					1185			
Val	Ile	Gln	Ala	Ala	Tyr	Thr	Val	Leu	Pro	Tyr	Ala	Gly	Thr	Arg
1190						1195					1200			
Met	Lys	Thr	Ala	Met	Val	Pro	Arg	Arg	Leu	Arg	Asn	Val	Lys	Ile
1205						1210					1215			
Ser	Ser	Ser	Leu	Ala	Asp	Leu	Glu	Ala	Gly	Asp	Ala	Leu	Asp	Ala
1220						1225					1230			
Gln	Ala	Ser	Ile	Lys	Asp	Arg	Asn	Ser	Gln	Ser	Phe	Ser	Thr	Asp
1235						1240					1245			
Leu	Ala	Val	Phe	Asp	Asp	Tyr	Asp	Ser	Gly	Ser	Ser	Pro	Ser	Asp
1250						1255					1260			
Gly	Ile	Pro	Val	Ile	Glu	Ile	Glu	Gly	Leu	Val	Phe	Gln	Ser	Val
1265						1270					1275			
Gly	Ser	Ser	Phe	Ser	Asp	Gln	Lys	Ser	Asp	Ser	Asn	Asp	Thr	Glu
1280						1285					1290			
Asn	Ala	Cys	Ser	Ser	Trp	Val	Trp	Ala	Pro	Asp	Ile	Ser	Leu	Gly
1295						1300					1305			

Asp	Ser	Thr	Trp	Leu	Lys	Glu	Lys	Leu	Ser	Thr	Glu	Ala	Glu	Thr
1310						1315					1320			
Lys	Glu	Thr	Glu	Leu	Met	Met	Asp	Leu	Arg	Arg	Cys	Thr	Ile	Asn
1325						1330					1335			
Phe	Ile	Gln	Glu	Ala	Val	Thr	Asp	Leu	Thr	Asn	Ser	Asp	Ile	Gln
1340						1345					1350			
His	Leu	Asp	Gly	His	Leu	Gln	Lys	Tyr	Phe	Asp	Trp	Met	Asn	Val
1355						1360					1365			
Gln	Leu	Asp	Leu	Ala	Arg	Gln	Asn	Lys	Leu	Ser	Pro	Ala	Ser	Cys
1370						1375					1380			
Asp	Trp	Leu	Ser	Asp	Asp	Ala	Glu	Gln	Lys	Lys	Cys	Leu	Gln	Ala
1385						1390					1395			
Arg	Val	Ala	Gly	Glu	Ser	Val	Asn	Gly	Glu	Met	Ile	Ser	Arg	Leu
1400						1405					1410			
Gly	Pro	Gln	Leu	Ile	Ala	Met	Leu	Arg	Arg	Glu	Thr	Glu	Pro	Leu
1415						1420					1425			
Glu	Leu	Met	Met	Gln	Asp	Gln	Leu	Leu	Ser	Arg	Tyr	Tyr	Val	Asn
1430						1435					1440			
Ala	Ile	Lys	Trp	Ser	Arg	Ser	Asn	Ala	Gln	Ala	Ser	Glu	Leu	Ile
1445						1450					1455			
Arg	Leu	Cys	Ala	His	Lys	Asn	Pro	Arg	Ser	Arg	Ile	Leu	Glu	Ile
1460						1465					1470			
Gly	Gly	Gly	Thr	Gly	Gly	Cys	Thr	Lys	Leu	Ile	Val	Asn	Ala	Leu
1475						1480					1485			
Gly	Asn	Thr	Lys	Pro	Ile	Asp	Arg	Tyr	Asp	Phe	Thr	Asp	Val	Ser
1490						1495					1500			

Ala	Gly	Phe	Phe	Glu	Ser	Ala	Arg	Glu	Gln	Phe	Ala	Asp	Trp	Gln
	1505					1510					1515			
Asp	Val	Met	Thr	Phe	Lys	Lys	Leu	Asp	Ile	Glu	Ser	Asp	Pro	Glu
	1520					1525					1530			
Gln	Gln	Gly	Phe	Glu	Cys	Ala	Thr	Tyr	Asp	Val	Val	Val	Ala	Cys
	1535					1540					1545			
Gln	Val	Leu	His	Ala	Thr	Arg	Cys	Met	Lys	Arg	Thr	Leu	Ser	Asn
	1550					1555					1560			
Val	Arg	Lys	Leu	Leu	Lys	Pro	Gly	Gly	Asn	Leu	Ile	Leu	Val	Glu
	1565					1570					1575			
Thr	Thr	Arg	Asp	Gln	Leu	Asp	Leu	Phe	Phe	Thr	Phe	Gly	Leu	Leu
	1580					1585					1590			
Pro	Gly	Trp	Trp	Leu	Ser	Glu	Glu	Pro	Glu	Arg	Lys	Ser	Thr	Pro
	1595					1600					1605			
Ser	Leu	Thr	Thr	Asp	Leu	Trp	Asn	Thr	Met	Leu	Asp	Thr	Ser	Gly
	1610					1615					1620			
Phe	Asn	Gly	Val	Glu	Leu	Glu	Val	Arg	Asp	Cys	Glu	Asp	Asp	Glu
	1625					1630					1635			
Phe	Tyr	Met	Ile	Ser	Thr	Met	Leu	Ser	Thr	Ala	Arg	Lys	Glu	Asn
	1640					1645					1650			
Thr	Thr	Pro	Asp	Thr	Val	Ala	Glu	Ser	Glu	Val	Leu	Leu	Leu	His
	1655					1660					1665			
Gly	Ala	Leu	Arg	Pro	Pro	Ser	Ser	Trp	Leu	Glu	Ser	Leu	Gln	Ala
	1670					1675					1680			
Ala	Ile	Cys	Glu	Lys	Thr	Ser	Ser	Ser	Pro	Ser	Ile	Asn	Ala	Leu

1685						1690					1695			
Gly	Glu	Val	Asp	Thr	Thr	Gly	Arg	Thr	Cys	Ile	Phe	Leu	Gly	Glu
	1700					1705					1710			
Met	Glu	Ser	Ser	Leu	Leu	Gly	Glu	Val	Gly	Ser	Glu	Thr	Phe	Lys
	1715					1720					1725			
Ser	Ile	Thr	Ala	Met	Leu	Asn	Asn	Cys	Asn	Ala	Leu	Leu	Trp	Val
	1730					1735					1740			
Ser	Arg	Gly	Ala	Ala	Met	Ser	Ser	Glu	Asp	Pro	Trp	Lys	Ala	Leu
	1745					1750					1755			
His	Ile	Gly	Leu	Leu	Arg	Thr	Ile	Arg	Asn	Glu	Asn	Asn	Gly	Lys
	1760					1765					1770			
Glu	Tyr	Val	Ser	Leu	Asp	Leu	Asp	Pro	Ser	Arg	Asn	Ala	Tyr	Thr
	1775					1780					1785			
His	Glu	Ser	Leu	Tyr	Ala	Ile	Cys	Asn	Ile	Phe	Asn	Gly	Arg	Leu
	1790					1795					1800			
Gly	Asp	Leu	Ser	Glu	Asp	Lys	Glu	Phe	Glu	Phe	Ala	Glu	Arg	Asn
	1805					1810					1815			
Gly	Val	Ile	His	Val	Pro	Arg	Leu	Phe	Asn	Asp	Pro	His	Trp	Lys
	1820					1825					1830			
Asp	Gln	Glu	Ala	Val	Glu	Val	Thr	Leu	Gln	Pro	Phe	Glu	Gln	Pro
	1835					1840					1845			
Gly	Arg	Arg	Leu	Arg	Met	Glu	Val	Glu	Thr	Pro	Gly	Leu	Leu	Asp
	1850					1855					1860			
Ser	Leu	Gln	Phe	Arg	Asp	Asp	Glu	Gly	Arg	Glu	Gly	Lys	Asp	Leu
	1865					1870					1875			

Pro	Asp	Asp	Trp	Val	Glu	Ile	Glu	Pro	Lys	Ala	Phe	Gly	Leu	Asn
1880						1885					1890			
Phe	Arg	Asp	Val	Met	Val	Ala	Met	Gly	Gln	Leu	Glu	Ala	Asn	Arg
1895						1900					1905			
Val	Met	Gly	Phe	Glu	Cys	Ala	Gly	Val	Ile	Thr	Lys	Leu	Gly	Gly
1910						1915					1920			
Ala	Ala	Ala	Ala	Ser	Gln	Gly	Leu	Arg	Leu	Gly	Asp	Arg	Val	Cys
1925						1930					1935			
Ala	Leu	Leu	Lys	Gly	His	Trp	Ala	Thr	Arg	Thr	Gln	Thr	Pro	Tyr
1940						1945					1950			
Thr	Asn	Val	Val	Arg	Ile	Pro	Asp	Glu	Met	Gly	Phe	Pro	Glu	Ala
1955						1960					1965			
Ala	Ser	Val	Pro	Leu	Ala	Phe	Thr	Thr	Ala	Tyr	Ile	Ala	Leu	Tyr
1970						1975					1980			
Thr	Thr	Ala	Lys	Leu	Arg	Arg	Gly	Glu	Arg	Val	Leu	Ile	His	Ser
1985						1990					1995			
Gly	Ala	Gly	Gly	Val	Gly	Gln	Ala	Ala	Ile	Ile	Leu	Ser	Gln	Leu
2000						2005					2010			
Ala	Gly	Ala	Glu	Val	Phe	Val	Thr	Ala	Gly	Thr	Gln	Ala	Lys	Arg
2015						2020					2025			
Asp	Phe	Val	Gly	Asp	Lys	Phe	Gly	Ile	Asn	Pro	Asp	His	Ile	Phe
2030						2035					2040			
Ser	Ser	Arg	Asn	Asp	Leu	Phe	Val	Asp	Gly	Ile	Lys	Ala	Tyr	Thr
2045						2050					2055			
Gly	Gly	Leu	Gly	Val	His	Val	Val	Leu	Asn	Ser	Leu	Ala	Gly	Gln
2060						2065					2070			

Leu	Leu	Gln	Ala	Ser	Phe	Asp	Cys	Met	Ala	Glu	Phe	Gly	Arg	Phe
2075						2080					2085			
Val	Glu	Ile	Gly	Lys	Lys	Asp	Leu	Glu	Gln	Asn	Ser	Arg	Leu	Asp
2090						2095					2100			
Met	Leu	Pro	Phe	Thr	Arg	Asp	Val	Ser	Phe	Thr	Ser	Ile	Asp	Leu
2105						2110					2115			
Leu	Ser	Trp	Gln	Arg	Ala	Lys	Ser	Glu	Glu	Val	Ser	Glu	Ala	Leu
2120						2125					2130			
Asn	His	Val	Thr	Lys	Leu	Leu	Glu	Thr	Lys	Ala	Ile	Gly	Leu	Ile
2135						2140					2145			
Gly	Pro	Ile	Gln	Gln	His	Ser	Leu	Ser	Asn	Ile	Glu	Lys	Ala	Phe
2150						2155					2160			
Arg	Thr	Met	Gln	Ser	Gly	Gln	His	Val	Gly	Lys	Val	Val	Val	Asn
2165						2170					2175			
Val	Ser	Gly	Asp	Glu	Leu	Val	Pro	Val	Gly	Asp	Gly	Gly	Phe	Ser
2180						2185					2190			
Leu	Lys	Leu	Lys	Pro	Asp	Ser	Ser	Tyr	Leu	Val	Ala	Gly	Gly	Leu
2195						2200					2205			
Gly	Gly	Ile	Gly	Lys	Gln	Ile	Cys	Gln	Trp	Leu	Val	Asp	His	Gly
2210						2215					2220			
Ala	Lys	His	Leu	Ile	Ile	Leu	Ser	Arg	Ser	Ala	Lys	Ala	Ser	Pro
2225						2230					2235			
Phe	Ile	Thr	Ser	Leu	Gln	Asn	Gln	Gln	Cys	Ala	Val	Tyr	Leu	His
2240						2245					2250			
Ala	Cys	Asp	Ile	Ser	Asp	Gln	Asp	Gln	Val	Thr	Lys	Val	Leu	Arg

2255					2260					2265				
Leu	Cys	Glu	Glu	Ala	His	Ala	Pro	Pro	Ile	Arg	Gly	Ile	Ile	Gln
2270						2275					2280			
Gly	Ala	Met	Val	Leu	Lys	Asp	Ala	Leu	Leu	Ser	Arg	Met	Thr	Leu
2285						2290					2295			
Asp	Glu	Phe	Asn	Ala	Ala	Thr	Arg	Pro	Lys	Val	Gln	Gly	Ser	Trp
2300						2305					2310			
Tyr	Leu	His	Lys	Ile	Ala	Gln	Asp	Val	Asp	Phe	Phe	Val	Met	Leu
2315						2320					2325			
Ser	Ser	Leu	Val	Gly	Val	Met	Gly	Gly	Ala	Gly	Gln	Ala	Asn	Tyr
2330						2335					2340			
Ala	Ala	Ala	Gly	Ala	Phe	Gln	Asp	Ala	Leu	Ala	His	His	Arg	Arg
2345						2350					2355			
Ala	His	Gly	Met	Pro	Ala	Val	Thr	Ile	Asp	Leu	Gly	Met	Val	Lys
2360						2365					2370			
Ser	Val	Gly	Tyr	Val	Ala	Glu	Thr	Gly	Arg	Gly	Val	Ala	Asp	Arg
2375						2380					2385			
Leu	Ala	Arg	Ile	Gly	Tyr	Lys	Pro	Met	His	Glu	Lys	Asp	Val	Met
2390						2395					2400			
Asp	Val	Leu	Glu	Lys	Ala	Ile	Leu	Cys	Ser	Ser	Pro	Gln	Phe	Pro
2405						2410					2415			
Ser	Pro	Pro	Ala	Ala	Val	Val	Thr	Gly	Ile	Asn	Thr	Ser	Pro	Gly
2420						2425					2430			
Ala	His	Trp	Thr	Glu	Ala	Asn	Trp	Ile	Gln	Glu	Gln	Arg	Phe	Val
2435						2440					2445			

Gly	Leu	Lys	Tyr	Arg	Gln	Val	Leu	His	Ala	Asp	Gln	Ser	Phe	Val
2450						2455					2460			
Ser	Ser	His	Lys	Lys	Gly	Pro	Asp	Gly	Val	Arg	Ala	Gln	Leu	Ser
2465						2470					2475			
Arg	Val	Thr	Ser	His	Asp	Glu	Ala	Ile	Ser	Ile	Val	Leu	Lys	Ala
2480						2485					2490			
Met	Thr	Glu	Lys	Leu	Met	Arg	Met	Phe	Gly	Leu	Ala	Glu	Asp	Asp
2495						2500					2505			
Met	Ser	Ser	Ser	Lys	Asn	Leu	Ala	Gly	Val	Gly	Val	Asp	Ser	Leu
2510						2515					2520			
Val	Ala	Ile	Glu	Leu	Arg	Asn	Trp	Ile	Thr	Ser	Glu	Ile	His	Val
2525						2530					2535			
Asp	Val	Ser	Ile	Phe	Glu	Leu	Met	Asn	Gly	Asn	Thr	Ile	Ala	Gly
2540						2545					2550			
Leu	Val	Glu	Leu	Val	Val	Ala	Lys	Cys	Ser					
2555						2560								

<210> 47

<211> 1557

<212> DNA

<213> Penicillium citrinum

<220>

<221> CDS

<222> (1) .. (1557)

<400> 47

atg ctc ggc cag gtt ctt ctg acc gtc gaa tcg tac caa tgg gta tcg

48

Met Leu Gly Gln Val Leu Leu Thr Val Glu Ser Tyr Gln Trp Val Ser

1

5

10

15

acc cct caa gcc ctt gtg gcg gtc gca gtg ctt ctt agt ctc atc gcc

96

Thr Pro Gln Ala Leu Val Ala Val Ala Val Leu Leu Ser Leu Ile Ala

20

25

30

tac cgt ttg cgg ggg cgc cag tcc gaa ctg caa gtc tat aat ccc aaa

144

Tyr Arg Leu Arg Gly Arg Gln Ser Glu Leu Gln Val Tyr Asn Pro Lys

35

40

45

aaa tgg tgg gag ttg acg acc atg agg gct agg cag gac ttc gat acg

192

Lys Trp Trp Glu Leu Thr Thr Met Arg Ala Arg Gln Asp Phe Asp Thr

50

55

60

tat ggt ccg agc tgg atc gaa gct tgg ttc tcg aaa aac gac aag ccc

240

Tyr Gly Pro Ser Trp Ile Glu Ala Trp Phe Ser Lys Asn Asp Lys Pro

65

70

75

80

ctg cgc ttc att gtt gat tcc ggc tat tgc acc atc ctc cca tcg tcc

288

Leu Arg Phe Ile Val Asp Ser Gly Tyr Cys Thr Ile Leu Pro Ser Ser

85

90

95

atg gcc gac gag ttt cgg aaa atc aaa gat atg tgc atg tac aag ttt

336

Met Ala Asp Glu Phe Arg Lys Ile Lys Asp Met Cys Met Tyr Lys Phe

100

105

110

ttg gcg gat gac ttt cac tct cat ctc cct gga ttc gac ggg ttc aag
 384
 Leu Ala Asp Asp Phe His Ser His Leu Pro Gly Phe Asp Gly Phe Lys
 115 120 125

gaa atc tgc cag gat gca cat ctt gtc aac aaa gtt gtt ttg aac cag
 432
 Glu Ile Cys Gln Asp Ala His Leu Val Asn Lys Val Val Leu Asn Gln
 130 135 140

tta caa acc caa gcc ccc aag tac aca aag cca ttg gct acc ttg gcc
 480
 Leu Gln Thr Gln Ala Pro Lys Tyr Thr Lys Pro Leu Ala Thr Leu Ala
 145 150 155 160

gac gct act att gcc aag ttg ttc ggt aaa agc gag gag tgg caa acc
 528
 Asp Ala Thr Ile Ala Lys Leu Phe Gly Lys Ser Glu Glu Trp Gln Thr
 165 170 175

gca cct gtc tat tcc aat gga ttg gac ctt gtc aca cga aca gtc aca
 576
 Ala Pro Val Tyr Ser Asn Gly Leu Asp Leu Val Thr Arg Thr Val Thr
 180 185 190

ctc att atg gtc ggc gac aaa atc tgc cac aat gag gag tgg ctg gat
 624
 Leu Ile Met Val Gly Asp Lys Ile Cys His Asn Glu Glu Trp Leu Asp
 195 200 205

att gca aag aac cat gcc gtg agt gtg gcg gta caa gct cgc caa ctt
 672
 Ile Ala Lys Asn His Ala Val Ser Val Ala Val Gln Ala Arg Gln Leu
 210 215 220

cgc gta tgg ccc atg cta ctg cga ccg ctc gct cac tgg ttt caa ccg

720
 Arg Val Trp Pro Met Leu Leu Arg Pro Leu Ala His Trp Phe Gln Pro
 225 230 235 240

 caa gga cgc aaa ttg cgt gac caa gtg cgc cgc gca cga aag atc att
 768
 Gln Gly Arg Lys Leu Arg Asp Gln Val Arg Arg Ala Arg Lys Ile Ile
 245 250 255

 gat cct gag att cag cga cga cgt gct gaa aag gcc gca tgt gta gcg
 816
 Asp Pro Glu Ile Gln Arg Arg Arg Ala Glu Lys Ala Ala Cys Val Ala
 260 265 270

 aag ggc gtg cag ccg ccc cag tac gtc gat acc atg caa tgg ttt gaa
 864
 Lys Gly Val Gln Pro Pro Gln Tyr Val Asp Thr Met Gln Trp Phe Glu
 275 280 285

 gac acc gcc gac ggc cgc tgg tac gat gtg gcg ggt gct cag ctc gct
 912
 Asp Thr Ala Asp Gly Arg Trp Tyr Asp Val Ala Gly Ala Gln Leu Ala
 290 295 300

 atg gat ttc gcc ggc atc tac gcc tcg acg gat ctt ttc gtc ggt gcc
 960
 Met Asp Phe Ala Gly Ile Tyr Ala Ser Thr Asp Leu Phe Val Gly Ala
 305 310 315 320

 ctt gtg gac att gcc agg cac cca gac ctt att cag cct ctc cgc caa
 1008
 Leu Val Asp Ile Ala Arg His Pro Asp Leu Ile Gln Pro Leu Arg Gln
 325 330 335

 gag atc cgc act gta atc gga gaa ggg ggc tgg acg cct gcc tct ctg
 1056

Glu Ile Arg Thr Val Ile Gly Glu Gly Gly Trp Thr Pro Ala Ser Leu
340 345 350

ttc aag ctg aag ctc ctc gac agc tgc atg aaa gag acg cag cga atc
1104
Phe Lys Leu Lys Leu Leu Asp Ser Cys Met Lys Glu Thr Gln Arg Ile
355 360 365

aag ccg gtc gag tgc gcc act atg cgc agt acc gct ctc aga gac atc
1152
Lys Pro Val Glu Cys Ala Thr Met Arg Ser Thr Ala Leu Arg Asp Ile
370 375 380

act cta tcc aat ggc ctc ttc att ccc aag ggc gag ttg gcc gct gtg
1200
Thr Leu Ser Asn Gly Leu Phe Ile Pro Lys Gly Glu Leu Ala Ala Val
385 390 395 400

gct gca gac cgc atg aac aac cct gat gtg tgg gaa aac ccc gaa aat
1248
Ala Ala Asp Arg Met Asn Asn Pro Asp Val Trp Glu Asn Pro Glu Asn
405 410 415

tat gat ccc tac cga ttt atg cgc atg cgc gag gat cca gac aag gcc
1296
Tyr Asp Pro Tyr Arg Phe Met Arg Met Arg Glu Asp Pro Asp Lys Ala
420 425 430

ttc acc gct caa ttg gag aat acc aac ggt gat cac atc ggc ttc ggc
1344
Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly
435 440 445

tgg aac cca cgc gct tgt ccc ggg cgg ttc ttc gcc tcg aag gaa atc
1392
Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile

450	455	460
aag att ctc ctc gct cat ata ctg att cag tat gat gtg aag cct gta		
1440		
Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val		
465	470	475
cca gga gac gat gac aaa tac tac cgt cac gct ttt agc gtt cgt atg		
1488		
Pro Gly Asp Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met		
485	490	495
cat cca acc aca aag ctc atg gta cgc cgg cgc aac gag gac atc ccg		
1536		
His Pro Thr Thr Lys Leu Met Val Arg Arg Arg Asn Glu Asp Ile Pro		
500	505	510
ctc cct cat gac cgg tgc taa		
1557		
Leu Pro His Asp Arg Cys		
515		

<210> 48

<211> 518

<212> PRT

<213> Penicillium citrinum

<400> 48

Met	Leu	Gly	Gln	Val	Leu	Leu	Thr	Val	Glu	Ser	Tyr	Gln	Trp	Val	Ser
1				5					10					15	

Thr Pro Gln Ala Leu Val Ala Val Ala Val Leu Leu Ser Leu Ile Ala

			20					25					30			
Tyr	Arg	Leu	Arg	Gly	Arg	Gln	Ser	Glu	Leu	Gln	Val	Tyr	Asn	Pro	Lys	
		35					40					45				
Lys	Trp	Trp	Glu	Leu	Thr	Thr	Met	Arg	Ala	Arg	Gln	Asp	Phe	Asp	Thr	
	50					55					60					
Tyr	Gly	Pro	Ser	Trp	Ile	Glu	Ala	Trp	Phe	Ser	Lys	Asn	Asp	Lys	Pro	
65					70					75					80	
Leu	Arg	Phe	Ile	Val	Asp	Ser	Gly	Tyr	Cys	Thr	Ile	Leu	Pro	Ser	Ser	
				85					90					95		
Met	Ala	Asp	Glu	Phe	Arg	Lys	Ile	Lys	Asp	Met	Cys	Met	Tyr	Lys	Phe	
			100					105					110			
Leu	Ala	Asp	Asp	Phe	His	Ser	His	Leu	Pro	Gly	Phe	Asp	Gly	Phe	Lys	
		115					120					125				
Glu	Ile	Cys	Gln	Asp	Ala	His	Leu	Val	Asn	Lys	Val	Val	Leu	Asn	Gln	
	130					135					140					
Leu	Gln	Thr	Gln	Ala	Pro	Lys	Tyr	Thr	Lys	Pro	Leu	Ala	Thr	Leu	Ala	
145					150					155					160	
Asp	Ala	Thr	Ile	Ala	Lys	Leu	Phe	Gly	Lys	Ser	Glu	Glu	Trp	Gln	Thr	
				165					170					175		
Ala	Pro	Val	Tyr	Ser	Asn	Gly	Leu	Asp	Leu	Val	Thr	Arg	Thr	Val	Thr	
			180					185					190			
Leu	Ile	Met	Val	Gly	Asp	Lys	Ile	Cys	His	Asn	Glu	Glu	Trp	Leu	Asp	
		195					200					205				
Ile	Ala	Lys	Asn	His	Ala	Val	Ser	Val	Ala	Val	Gln	Ala	Arg	Gln	Leu	
	210					215					220					

Arg	Val	Trp	Pro	Met	Leu	Leu	Arg	Pro	Leu	Ala	His	Trp	Phe	Gln	Pro
225					230					235					240
Gln	Gly	Arg	Lys	Leu	Arg	Asp	Gln	Val	Arg	Arg	Ala	Arg	Lys	Ile	Ile
				245					250					255	
Asp	Pro	Glu	Ile	Gln	Arg	Arg	Arg	Ala	Glu	Lys	Ala	Ala	Cys	Val	Ala
			260					265					270		
Lys	Gly	Val	Gln	Pro	Pro	Gln	Tyr	Val	Asp	Thr	Met	Gln	Trp	Phe	Glu
		275					280					285			
Asp	Thr	Ala	Asp	Gly	Arg	Trp	Tyr	Asp	Val	Ala	Gly	Ala	Gln	Leu	Ala
	290					295					300				
Met	Asp	Phe	Ala	Gly	Ile	Tyr	Ala	Ser	Thr	Asp	Leu	Phe	Val	Gly	Ala
305					310					315					320
Leu	Val	Asp	Ile	Ala	Arg	His	Pro	Asp	Leu	Ile	Gln	Pro	Leu	Arg	Gln
				325					330					335	
Glu	Ile	Arg	Thr	Val	Ile	Gly	Glu	Gly	Gly	Trp	Thr	Pro	Ala	Ser	Leu
			340					345					350		
Phe	Lys	Leu	Lys	Leu	Leu	Asp	Ser	Cys	Met	Lys	Glu	Thr	Gln	Arg	Ile
		355					360					365			
Lys	Pro	Val	Glu	Cys	Ala	Thr	Met	Arg	Ser	Thr	Ala	Leu	Arg	Asp	Ile
	370					375					380				
Thr	Leu	Ser	Asn	Gly	Leu	Phe	Ile	Pro	Lys	Gly	Glu	Leu	Ala	Ala	Val
385					390					395					400
Ala	Ala	Asp	Arg	Met	Asn	Asn	Pro	Asp	Val	Trp	Glu	Asn	Pro	Glu	Asn
				405					410					415	
Tyr	Asp	Pro	Tyr	Arg	Phe	Met	Arg	Met	Arg	Glu	Asp	Pro	Asp	Lys	Ala
			420					425					430		

Phe Thr Ala Gln Leu Glu Asn Thr Asn Gly Asp His Ile Gly Phe Gly
435 440 445

Trp Asn Pro Arg Ala Cys Pro Gly Arg Phe Phe Ala Ser Lys Glu Ile
450 455 460

Lys Ile Leu Leu Ala His Ile Leu Ile Gln Tyr Asp Val Lys Pro Val
465 470 475 480

Pro Gly Asp Asp Asp Lys Tyr Tyr Arg His Ala Phe Ser Val Arg Met
485 490 495

His Pro Thr Thr Lys Leu Met Val Arg Arg Arg Asn Glu Asp Ile Pro
500 505 510

Leu Pro His Asp Arg Cys
515

<210> 49

<211> 3522

<212> DNA

<213> Penicillium citrinum

<220>

<221> CDS

<222> (1)..(3522)

<400> 49

atg gtc gct tcg ttg cta ccc tct cgc ttt cgc ggt agg gaa tca atg
48

Met Val Ala Ser Leu Leu Pro Ser Arg Phe Arg Gly Arg Glu Ser Met

1

5

10

15

aat cag cag cac cct cta cgc tcg gga aat cgg gca ttg acc tcc aca
96
Asn Gln Gln His Pro Leu Arg Ser Gly Asn Arg Ala Leu Thr Ser Thr

20

25

30

ctc caa ttt cta tcc aaa acg gcg tgt cta cac ccg atc cat acc gtt
144
Leu Gln Phe Leu Ser Lys Thr Ala Cys Leu His Pro Ile His Thr Val

35

40

45

tgc acc ata gct att cta gct agt acc aca tac gtt gga cta ctc aaa
192
Cys Thr Ile Ala Ile Leu Ala Ser Thr Thr Tyr Val Gly Leu Leu Lys

50

55

60

gac agc ttc ttc cat ggc ccc gca aac gtt gat aaa gca gaa tgg ggc
240
Asp Ser Phe Phe His Gly Pro Ala Asn Val Asp Lys Ala Glu Trp Gly

65

70

75

80

tct ttg gtc gaa gga agt cga agc ttg atc acc ggc cca cag aat ggc
288
Ser Leu Val Glu Gly Ser Arg Ser Leu Ile Thr Gly Pro Gln Asn Gly

85

90

95

tgg aag tgg cag agc ttc gac ggg gat gca gat gtt ctc gga gat ttc
336
Trp Lys Trp Gln Ser Phe Asp Gly Asp Ala Asp Val Leu Gly Asp Phe

100

105

110

aac cat caa gca cta atg acc ttg gta ttc ccg ggg tca tat ggg gtt
384
Asn His Gln Ala Leu Met Thr Leu Val Phe Pro Gly Ser Tyr Gly Val

115

120

125

gca tct caa gca gcc tca cca ttc ctt gct ccc ctc cct gtg aac cta

432
 Ala Ser Gln Ala Ala Ser Pro Phe Leu Ala Pro Leu Pro Val Asn Leu
 130 135 140
 tct gtg att gac ctt ccc tca acg tcg agc cct tta acc gcc tat tcg
 480
 Ser Val Ile Asp Leu Pro Ser Thr Ser Ser Pro Leu Thr Ala Tyr Ser
 145 150 155 160
 aaa gat aaa gtt ttc gcc ttc tct gtg gaa tac agc agc gcg ccg gaa
 528
 Lys Asp Lys Val Phe Ala Phe Ser Val Glu Tyr Ser Ser Ala Pro Glu
 165 170 175
 ctc gtg gct gct gtt caa gaa atc ccc aac aac agt gcc gac ctg aaa
 576
 Leu Val Ala Ala Val Gln Glu Ile Pro Asn Asn Ser Ala Asp Leu Lys
 180 185 190
 ttg cag gag acg caa ttg atc gag atg gaa cgc cag atg tgg atc atg
 624
 Leu Gln Glu Thr Gln Leu Ile Glu Met Glu Arg Gln Met Trp Ile Met
 195 200 205
 aag gct gcc agg gct cac aca aaa cgc agc ctt gct caa tgg gtg cac
 672
 Lys Ala Ala Arg Ala His Thr Lys Arg Ser Leu Ala Gln Trp Val His
 210 215 220
 gat acc tgg aca gag tct ctt gat ctt atc aag agc gct caa acg ctc
 720
 Asp Thr Trp Thr Glu Ser Leu Asp Leu Ile Lys Ser Ala Gln Thr Leu
 225 230 235 240
 gac gtg gtt gtc atg gtg cta ggt tat ata tca atg cac ttg act ttc
 768

Asp Val Val Val Met Val Leu Gly Tyr Ile Ser Met His Leu Thr Phe
245 250 255

gtc tca ctc ttc ctc agc atg aaa aaa ttg gga tcg aag gtt tgg ctg
816
Val Ser Leu Phe Leu Ser Met Lys Lys Leu Gly Ser Lys Val Trp Leu
260 265 270

gct aca agc gtc ctt ttg tcg tca aca ttt gcc ttt ctc ctc ggt ctc
864
Ala Thr Ser Val Leu Leu Ser Ser Thr Phe Ala Phe Leu Leu Gly Leu
275 280 285

gac gtg gcc ata aga cta ggg gtt ccg atg agc atg agg ttg cta tcc
912
Asp Val Ala Ile Arg Leu Gly Val Pro Met Ser Met Arg Leu Leu Ser
290 295 300

gaa ggc ctc ccc ttc ttg gtg gtg atc gtt ggc ttt gag aag agc atc
960
Glu Gly Leu Pro Phe Leu Val Val Ile Val Gly Phe Glu Lys Ser Ile
305 310 315 320

act ctg acc agg gct gtt ttg tcc tat gct gtg cag cac cga aag ccc
1008
Thr Leu Thr Arg Ala Val Leu Ser Tyr Ala Val Gln His Arg Lys Pro
325 330 335

cag aag ata cag tct gac cag ggt agc gtg aca gcc att gct gaa agt
1056
Gln Lys Ile Gln Ser Asp Gln Gly Ser Val Thr Ala Ile Ala Glu Ser
340 345 350

acc atc aat tac gcc gta cga agc gcc att cgg gag aag ggt tac aat
1104
Thr Ile Asn Tyr Ala Val Arg Ser Ala Ile Arg Glu Lys Gly Tyr Asn

355	360	365		
atc gtg tgc cac tac gtg gtc gag atc ctg ctc cta gtt atc ggt gct 1152 Ile Val Cys His Tyr Val Val Glu Ile Leu Leu Leu Val Ile Gly Ala				
370	375	380		
gtc tta ggc atc caa ggt ggg cta cag cac ttc tgt gtt cta gct gca 1200 Val Leu Gly Ile Gln Gly Gly Leu Gln His Phe Cys Val Leu Ala Ala				
385	390	395	400	
ttg atc ctg ttc ttt gac tgt ctg ctg ctg ttt aca ttc tac act gcg 1248 Leu Ile Leu Phe Phe Asp Cys Leu Leu Leu Phe Thr Phe Tyr Thr Ala				
405		410		415
att ctg tct atc aag ctc gag gta aac cgc ctc aaa cgt cat atc aac 1296 Ile Leu Ser Ile Lys Leu Glu Val Asn Arg Leu Lys Arg His Ile Asn				
420		425		430
atg cgg tac gcg ttg gaa gat gag ggt ctc agt cag cgg acg gcg gag 1344 Met Arg Tyr Ala Leu Glu Asp Glu Gly Leu Ser Gln Arg Thr Ala Glu				
435		440		445
agt gtc gcg acc agc aat gat gcc caa gac agt gca cgt aca tat ctg 1392 Ser Val Ala Thr Ser Asn Asp Ala Gln Asp Ser Ala Arg Thr Tyr Leu				
450		455		460
ttt ggc aat gat atg aaa ggc agc agt gtt ccg aag ttc aaa ttc tgg 1440 Phe Gly Asn Asp Met Lys Gly Ser Ser Val Pro Lys Phe Lys Phe Trp				

465	470	475	480
atg gtc gtt ggt ttc ctt atc gtc aac ctc gtc aac atc ggc tcc acc			
1488			
Met Val Val Gly Phe Leu Ile Val Asn Leu Val Asn Ile Gly Ser Thr			
	485	490	495
ctt ttc caa gcc tct tct agt gga tcg ttg tcc agt ata tca tct tgg			
1536			
Leu Phe Gln Ala Ser Ser Ser Gly Ser Leu Ser Ser Ile Ser Ser Trp			
	500	505	510
acc gaa agt ctg agc gga tcg gcc att aaa ccc ccg ctt gag ccc ttc			
1584			
Thr Glu Ser Leu Ser Gly Ser Ala Ile Lys Pro Pro Leu Glu Pro Phe			
	515	520	525
aag gta gct gga agt gga cta gat gaa cta ctt ttc cag gca aga ggg			
1632			
Lys Val Ala Gly Ser Gly Leu Asp Glu Leu Leu Phe Gln Ala Arg Gly			
	530	535	540
cgc ggt caa tcg act atg gtc act gtc ctc gcc ccc atc aag tac gaa			
1680			
Arg Gly Gln Ser Thr Met Val Thr Val Leu Ala Pro Ile Lys Tyr Glu			
545	550	555	560
cta gag tat cct tcc att cac cgt ggt acc tcg cag cta cac gag tat			
1728			
Leu Glu Tyr Pro Ser Ile His Arg Gly Thr Ser Gln Leu His Glu Tyr			
	565	570	575
gga gtt ggt gga aaa atg gtc ggt agc ctg ctc acc agc ctg gaa gat			
1776			
Gly Val Gly Gly Lys Met Val Gly Ser Leu Leu Thr Ser Leu Glu Asp			
	580	585	590

ccc gtc ctc tcc aaa tgg gtg ttt gtg gca ctt gcc cta agt gtc gct
1824

Pro Val Leu Ser Lys Trp Val Phe Val Ala Leu Ala Leu Ser Val Ala

595

600

605

ctg aac agc tat ctg ttc aag gcc gcc aga ctg gga atc aaa gat cct
1872

Leu Asn Ser Tyr Leu Phe Lys Ala Ala Arg Leu Gly Ile Lys Asp Pro

610

615

620

aat ctc ccg agt cac cca gtt gat cca gtt gag ctt gac cag gcc gaa
1920

Asn Leu Pro Ser His Pro Val Asp Pro Val Glu Leu Asp Gln Ala Glu

625

630

635

640

agc ttc aac gct gcc cag aac cag acc cct cag att caa tca agt ctc
1968

Ser Phe Asn Ala Ala Gln Asn Gln Thr Pro Gln Ile Gln Ser Ser Leu

645

650

655

caa gct cct cag acc aga gtg ttc act cct acc acc acc gac agt gac
2016

Gln Ala Pro Gln Thr Arg Val Phe Thr Pro Thr Thr Thr Asp Ser Asp

660

665

670

agt gat gcc tca tta gtc tta att aaa gca tct cta aag gtc act aag
2064

Ser Asp Ala Ser Leu Val Leu Ile Lys Ala Ser Leu Lys Val Thr Lys

675

680

685

cga gca gaa gga aag aca gcc act agt gaa ctt ccc gtg tct cgc aca
2112

Arg Ala Glu Gly Lys Thr Ala Thr Ser Glu Leu Pro Val Ser Arg Thr

690

695

700

caa atc gaa ctg gac aat ttg ctg aag cag aac aca atc agc gag ttg
2160

Gln Ile Glu Leu Asp Asn Leu Leu Lys Gln Asn Thr Ile Ser Glu Leu

705

710

715

720

aac gat gag gat gtc gtt gcc ttg tct ttg cgg gga aag gtt ccc ggg
2208

Asn Asp Glu Asp Val Val Ala Leu Ser Leu Arg Gly Lys Val Pro Gly

725

730

735

tat gcc cta gag aag agt ctc aaa gac tgc act cgt gcc gtc aag gtt
2256

Tyr Ala Leu Glu Lys Ser Leu Lys Asp Cys Thr Arg Ala Val Lys Val

740

745

750

cgc cgc tct atc att tcg agg aca ccg gct acc gca gag ctt aca agt
2304

Arg Arg Ser Ile Ile Ser Arg Thr Pro Ala Thr Ala Glu Leu Thr Ser

755

760

765

atg ctg gag cac tcg aag ctg ccg tac gaa aac tac gcc tgg gaa cgc
2352

Met Leu Glu His Ser Lys Leu Pro Tyr Glu Asn Tyr Ala Trp Glu Arg

770

775

780

gtg ctc ggt gca tgt tgc gag aac gtt att ggc tat atg cca gtc cct
2400

Val Leu Gly Ala Cys Cys Glu Asn Val Ile Gly Tyr Met Pro Val Pro

785

790

795

800

gtt ggc gtc gcc ggt cct att gtt atc gac ggc aag agt tat ttc att
2448

Val Gly Val Ala Gly Pro Ile Val Ile Asp Gly Lys Ser Tyr Phe Ile

805

810

815

cct atg gca acc acc gag ggc gtc ctc gtc gct agt gct agc cgt ggc

2496
 Pro Met Ala Thr Thr Glu Gly Val Leu Val Ala Ser Ala Ser Arg Gly
 820 825 830

 agt aag gca atc aac ctc ggt ggc ggt gcc gtg aca gtc ctg act ggc
 2544
 Ser Lys Ala Ile Asn Leu Gly Gly Gly Ala Val Thr Val Leu Thr Gly
 835 840 845

 gac ggt atg aca cga ggc ccg tgt gtg aag ttt gat gtc ctt gaa cga
 2592
 Asp Gly Met Thr Arg Gly Pro Cys Val Lys Phe Asp Val Leu Glu Arg
 850 855 860

 gct ggt gct gct aag atc tgg ctc gat tcg gac gtc ggc cag acc gta
 2640
 Ala Gly Ala Ala Lys Ile Trp Leu Asp Ser Asp Val Gly Gln Thr Val
 865 870 875 880

 atg aaa gaa gcc ttc aat tca acc agc aga ttt gcg cgc tta caa agt
 2688
 Met Lys Glu Ala Phe Asn Ser Thr Ser Arg Phe Ala Arg Leu Gln Ser
 885 890 895

 atg cgg aca act atc gcc ggt act cac tta tat att cga ttt aag act
 2736
 Met Arg Thr Thr Ile Ala Gly Thr His Leu Tyr Ile Arg Phe Lys Thr
 900 905 910

 act act ggc gac gct atg gga atg aat atg att tct aag ggc gtg gag
 2784
 Thr Thr Gly Asp Ala Met Gly Met Asn Met Ile Ser Lys Gly Val Glu
 915 920 925

 cat gca ctg aat gtt atg gcg aca gag gca ggt ttc agc gat atg aat
 2832

His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn
930 935 940

att att acc cta tca gga aat tac tgt acg gat aag aaa cct tca gct
2880
Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala
945 950 955 960

ttg aat tgg atc gat gga cgg ggc aag ggc att gtg gcc gaa gcc atc
2928
Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile
965 970 975

ata ccg gcg aac gtt gtc agg gat gtc tta aag agc gat gtg gat agc
2976
Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser
980 985 990

atg gtt cag ctc aac ata tcg aaa aat ctg att ggg tcc gct atg gct
3024
Met Val Gln Leu Asn Ile Ser Lys Asn Leu Ile Gly Ser Ala Met Ala
995 1000 1005

ggc tca gtt ggc ggc ttc aac gcc caa gct gcc aat ctt gcg gca
3069
Gly Ser Val Gly Gly Phe Asn Ala Gln Ala Ala Asn Leu Ala Ala
1010 1015 1020

gcc att ttc att gcc aca ggt cag gat ccg gcg caa gtt gtg gag
3114
Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala Gln Val Val Glu
1025 1030 1035

agc gct aac tgc atc act ctc atg aac aat ctt cgc gga tcg ctt
3159
Ser Ala Asn Cys Ile Thr Leu Met Asn Asn Leu Arg Gly Ser Leu

1040	1045	1050
caa atc tct gtc tcc atg ccg tct att gag gtt gga acg ttg ggc 3204		
Gln Ile Ser Val Ser Met Pro Ser Ile Glu Val Gly Thr Leu Gly		
1055	1060	1065
ggt ggt acg att ctg gag ccc cag ggc gca atg ctt gac atg ctt 3249		
Gly Gly Thr Ile Leu Glu Pro Gln Gly Ala Met Leu Asp Met Leu		
1070	1075	1080
ggt gtc cgc gga tca cac ccg acc act ccc ggt gag aat gca cgt 3294		
Gly Val Arg Gly Ser His Pro Thr Thr Pro Gly Glu Asn Ala Arg		
1085	1090	1095
caa ctt gcg cgc atc atc gga agc gct gtt ttg gct ggg gag ctc 3339		
Gln Leu Ala Arg Ile Ile Gly Ser Ala Val Leu Ala Gly Glu Leu		
1100	1105	1110
tcg cta tgt gct gcc cta gcc gcc ggt cac ctg gtc aag gcg cac 3384		
Ser Leu Cys Ala Ala Leu Ala Ala Gly His Leu Val Lys Ala His		
1115	1120	1125
atg gcg cac aac cgt tct gcc ccg gca tct tca gcc cct tct cga 3429		
Met Ala His Asn Arg Ser Ala Pro Ala Ser Ser Ala Pro Ser Arg		
1130	1135	1140
agt gtc tcc ccg tca ggc gga acc agg aca gtc cct gtt cct aac 3474		
Ser Val Ser Pro Ser Gly Gly Thr Arg Thr Val Pro Val Pro Asn		

1145 1150 1155

aat gca ctg agg ccg agt gct gca gct act gat cgg gct cga cgc
 3519
 Asn Ala Leu Arg Pro Ser Ala Ala Ala Thr Asp Arg Ala Arg Arg

1160 1165 1170

tga
 3522

<210> 50

<211> 1173

<212> PRT

<213> *Penicillium citrinum*

<400> 50

Met Val Ala Ser Leu Leu Pro Ser Arg Phe Arg Gly Arg Glu Ser Met
 1 5 10 15

Asn Gln Gln His Pro Leu Arg Ser Gly Asn Arg Ala Leu Thr Ser Thr
 20 25 30

Leu Gln Phe Leu Ser Lys Thr Ala Cys Leu His Pro Ile His Thr Val
 35 40 45

Cys Thr Ile Ala Ile Leu Ala Ser Thr Thr Tyr Val Gly Leu Leu Lys
 50 55 60

Asp Ser Phe Phe His Gly Pro Ala Asn Val Asp Lys Ala Glu Trp Gly
 65 70 75 80

Ser Leu Val Glu Gly Ser Arg Ser Leu Ile Thr Gly Pro Gln Asn Gly
 85 90 95

Trp	Lys	Trp	Gln	Ser	Phe	Asp	Gly	Asp	Ala	Asp	Val	Leu	Gly	Asp	Phe	100	105	110
Asn	His	Gln	Ala	Leu	Met	Thr	Leu	Val	Phe	Pro	Gly	Ser	Tyr	Gly	Val	115	120	125
Ala	Ser	Gln	Ala	Ala	Ser	Pro	Phe	Leu	Ala	Pro	Leu	Pro	Val	Asn	Leu	130	135	140
Ser	Val	Ile	Asp	Leu	Pro	Ser	Thr	Ser	Ser	Pro	Leu	Thr	Ala	Tyr	Ser	145	150	155
Lys	Asp	Lys	Val	Phe	Ala	Phe	Ser	Val	Glu	Tyr	Ser	Ser	Ala	Pro	Glu	165	170	175
Leu	Val	Ala	Ala	Val	Gln	Glu	Ile	Pro	Asn	Asn	Ser	Ala	Asp	Leu	Lys	180	185	190
Leu	Gln	Glu	Thr	Gln	Leu	Ile	Glu	Met	Glu	Arg	Gln	Met	Trp	Ile	Met	195	200	205
Lys	Ala	Ala	Arg	Ala	His	Thr	Lys	Arg	Ser	Leu	Ala	Gln	Trp	Val	His	210	215	220
Asp	Thr	Trp	Thr	Glu	Ser	Leu	Asp	Leu	Ile	Lys	Ser	Ala	Gln	Thr	Leu	225	230	235
Asp	Val	Val	Val	Met	Val	Leu	Gly	Tyr	Ile	Ser	Met	His	Leu	Thr	Phe	245	250	255
Val	Ser	Leu	Phe	Leu	Ser	Met	Lys	Lys	Leu	Gly	Ser	Lys	Val	Trp	Leu	260	265	270
Ala	Thr	Ser	Val	Leu	Leu	Ser	Ser	Thr	Phe	Ala	Phe	Leu	Leu	Gly	Leu	275	280	285
Asp	Val	Ala	Ile	Arg	Leu	Gly	Val	Pro	Met	Ser	Met	Arg	Leu	Leu	Ser	290	295	300

Glu Gly Leu Pro Phe Leu Val Val Ile Val Gly Phe Glu Lys Ser Ile
305 310 315 320

Thr Leu Thr Arg Ala Val Leu Ser Tyr Ala Val Gln His Arg Lys Pro
325 330 335

Gln Lys Ile Gln Ser Asp Gln Gly Ser Val Thr Ala Ile Ala Glu Ser
340 345 350

Thr Ile Asn Tyr Ala Val Arg Ser Ala Ile Arg Glu Lys Gly Tyr Asn
355 360 365

Ile Val Cys His Tyr Val Val Glu Ile Leu Leu Leu Val Ile Gly Ala
370 375 380

Val Leu Gly Ile Gln Gly Gly Leu Gln His Phe Cys Val Leu Ala Ala
385 390 395 400

Leu Ile Leu Phe Phe Asp Cys Leu Leu Leu Phe Thr Phe Tyr Thr Ala
405 410 415

Ile Leu Ser Ile Lys Leu Glu Val Asn Arg Leu Lys Arg His Ile Asn
420 425 430

Met Arg Tyr Ala Leu Glu Asp Glu Gly Leu Ser Gln Arg Thr Ala Glu
435 440 445

Ser Val Ala Thr Ser Asn Asp Ala Gln Asp Ser Ala Arg Thr Tyr Leu
450 455 460

Phe Gly Asn Asp Met Lys Gly Ser Ser Val Pro Lys Phe Lys Phe Trp
465 470 475 480

Met Val Val Gly Phe Leu Ile Val Asn Leu Val Asn Ile Gly Ser Thr
485 490 495

Leu Phe Gln Ala Ser Ser Ser Gly Ser Leu Ser Ser Ile Ser Ser Trp

500							505					510				
Thr	Glu	Ser	Leu	Ser	Gly	Ser	Ala	Ile	Lys	Pro	Pro	Leu	Glu	Pro	Phe	
		515					520					525				
Lys	Val	Ala	Gly	Ser	Gly	Leu	Asp	Glu	Leu	Leu	Phe	Gln	Ala	Arg	Gly	
	530					535					540					
Arg	Gly	Gln	Ser	Thr	Met	Val	Thr	Val	Leu	Ala	Pro	Ile	Lys	Tyr	Glu	
545					550					555					560	
Leu	Glu	Tyr	Pro	Ser	Ile	His	Arg	Gly	Thr	Ser	Gln	Leu	His	Glu	Tyr	
				565					570					575		
Gly	Val	Gly	Gly	Lys	Met	Val	Gly	Ser	Leu	Leu	Thr	Ser	Leu	Glu	Asp	
			580					585					590			
Pro	Val	Leu	Ser	Lys	Trp	Val	Phe	Val	Ala	Leu	Ala	Leu	Ser	Val	Ala	
		595					600					605				
Leu	Asn	Ser	Tyr	Leu	Phe	Lys	Ala	Ala	Arg	Leu	Gly	Ile	Lys	Asp	Pro	
	610					615					620					
Asn	Leu	Pro	Ser	His	Pro	Val	Asp	Pro	Val	Glu	Leu	Asp	Gln	Ala	Glu	
625					630					635					640	
Ser	Phe	Asn	Ala	Ala	Gln	Asn	Gln	Thr	Pro	Gln	Ile	Gln	Ser	Ser	Leu	
				645					650					655		
Gln	Ala	Pro	Gln	Thr	Arg	Val	Phe	Thr	Pro	Thr	Thr	Thr	Asp	Ser	Asp	
			660					665					670			
Ser	Asp	Ala	Ser	Leu	Val	Leu	Ile	Lys	Ala	Ser	Leu	Lys	Val	Thr	Lys	
		675					680					685				
Arg	Ala	Glu	Gly	Lys	Thr	Ala	Thr	Ser	Glu	Leu	Pro	Val	Ser	Arg	Thr	
	690					695					700					

Gln 705	Ile	Glu	Leu	Asp	Asn 710	Leu	Leu	Lys	Gln	Asn 715	Thr	Ile	Ser	Glu	Leu 720
Asn	Asp	Glu	Asp	Val 725	Val	Ala	Leu	Ser	Leu 730	Arg	Gly	Lys	Val	Pro 735	Gly
Tyr	Ala	Leu	Glu 740	Lys	Ser	Leu	Lys	Asp 745	Cys	Thr	Arg	Ala	Val 750	Lys	Val
Arg	Arg	Ser 755	Ile	Ile	Ser	Arg	Thr 760	Pro	Ala	Thr	Ala	Glu 765	Leu	Thr	Ser
Met	Leu 770	Glu	His	Ser	Lys	Leu 775	Pro	Tyr	Glu	Asn	Tyr 780	Ala	Trp	Glu	Arg
Val 785	Leu	Gly	Ala	Cys	Cys 790	Glu	Asn	Val	Ile	Gly 795	Tyr	Met	Pro	Val	Pro 800
Val	Gly	Val	Ala	Gly 805	Pro	Ile	Val	Ile	Asp 810	Gly	Lys	Ser	Tyr	Phe 815	Ile
Pro	Met	Ala	Thr 820	Thr	Glu	Gly	Val	Leu 825	Val	Ala	Ser	Ala	Ser 830	Arg	Gly
Ser	Lys	Ala 835	Ile	Asn	Leu	Gly	Gly 840	Gly	Ala	Val	Thr	Val 845	Leu	Thr	Gly
Asp 850	Gly	Met	Thr	Arg	Gly	Pro 855	Cys	Val	Lys	Phe	Asp 860	Val	Leu	Glu	Arg
Ala 865	Gly	Ala	Ala	Lys	Ile 870	Trp	Leu	Asp	Ser	Asp 875	Val	Gly	Gln	Thr	Val 880
Met	Lys	Glu	Ala	Phe 885	Asn	Ser	Thr	Ser	Arg 890	Phe	Ala	Arg	Leu	Gln 895	Ser
Met	Arg	Thr 900	Thr	Ile	Ala	Gly	Thr	His 905	Leu	Tyr	Ile	Arg	Phe 910	Lys	Thr

Thr Thr Gly Asp Ala Met Gly Met Asn Met Ile Ser Lys Gly Val Glu
915 920 925

His Ala Leu Asn Val Met Ala Thr Glu Ala Gly Phe Ser Asp Met Asn
930 935 940

Ile Ile Thr Leu Ser Gly Asn Tyr Cys Thr Asp Lys Lys Pro Ser Ala
945 950 955 960

Leu Asn Trp Ile Asp Gly Arg Gly Lys Gly Ile Val Ala Glu Ala Ile
965 970 975

Ile Pro Ala Asn Val Val Arg Asp Val Leu Lys Ser Asp Val Asp Ser
980 985 990

Met Val Gln Leu Asn Ile Ser Lys Asn Leu Ile Gly Ser Ala Met Ala
995 1000 1005

Gly Ser Val Gly Gly Phe Asn Ala Gln Ala Ala Asn Leu Ala Ala
1010 1015 1020

Ala Ile Phe Ile Ala Thr Gly Gln Asp Pro Ala Gln Val Val Glu
1025 1030 1035

Ser Ala Asn Cys Ile Thr Leu Met Asn Asn Leu Arg Gly Ser Leu
1040 1045 1050

Gln Ile Ser Val Ser Met Pro Ser Ile Glu Val Gly Thr Leu Gly
1055 1060 1065

Gly Gly Thr Ile Leu Glu Pro Gln Gly Ala Met Leu Asp Met Leu
1070 1075 1080

Gly Val Arg Gly Ser His Pro Thr Thr Pro Gly Glu Asn Ala Arg
1085 1090 1095

Gln Leu Ala Arg Ile Ile Gly Ser Ala Val Leu Ala Gly Glu Leu

1100	1105	1110
Ser Leu Cys Ala Ala Leu 1115	Ala Ala Gly His Leu 1120	Val Lys Ala His 1125
Met Ala His Asn Arg Ser 1130	Ala Pro Ala Ser Ser 1135	Ala Pro Ser Arg 1140
Ser Val Ser Pro Ser Gly 1145	Gly Thr Arg Thr Val 1150	Pro Val Pro Asn 1155
Asn Ala Leu Arg Pro Ser 1160	Ala Ala Thr Asp 1165	Arg Ala Arg Arg 1170

<210> 51

<211> 20

<212> DNA

<213> Penicillium citrinum

<400> 51
gcaagctctg ctaccagcac
20

<210> 52

<211> 20

<212> DNA

<213> Penicillium citrinum

<400> 52
ctaggccaac ttcagagccg
20

<210> 53

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 53

agtcatgcag gatctgggtc
20

<210> 54

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 54

gcagacacat cggatgaagtc
20

<210> 55

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 55

aaaccgcacc tgtctattcc
20

<210> 56

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 56
ctttgtggtt ggatgcatac
20

<210> 57

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 57
cgctctatca tttcgaggac
20

<210> 58

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 58
tcaatagacg gcatggagac
20

<210> 59

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 59
atgtcagaac ctctaccccc
20

<210> 60

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 60

tcaagcatca gtctcaggca
20

<210> 61

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 61

atgtccctgc cgcattgcaac
20

<210> 62

<211> 20

<212> DNA

<213> *Penicillium citrinum*

<400> 62

ctaagcaata ttgtgtttct
20